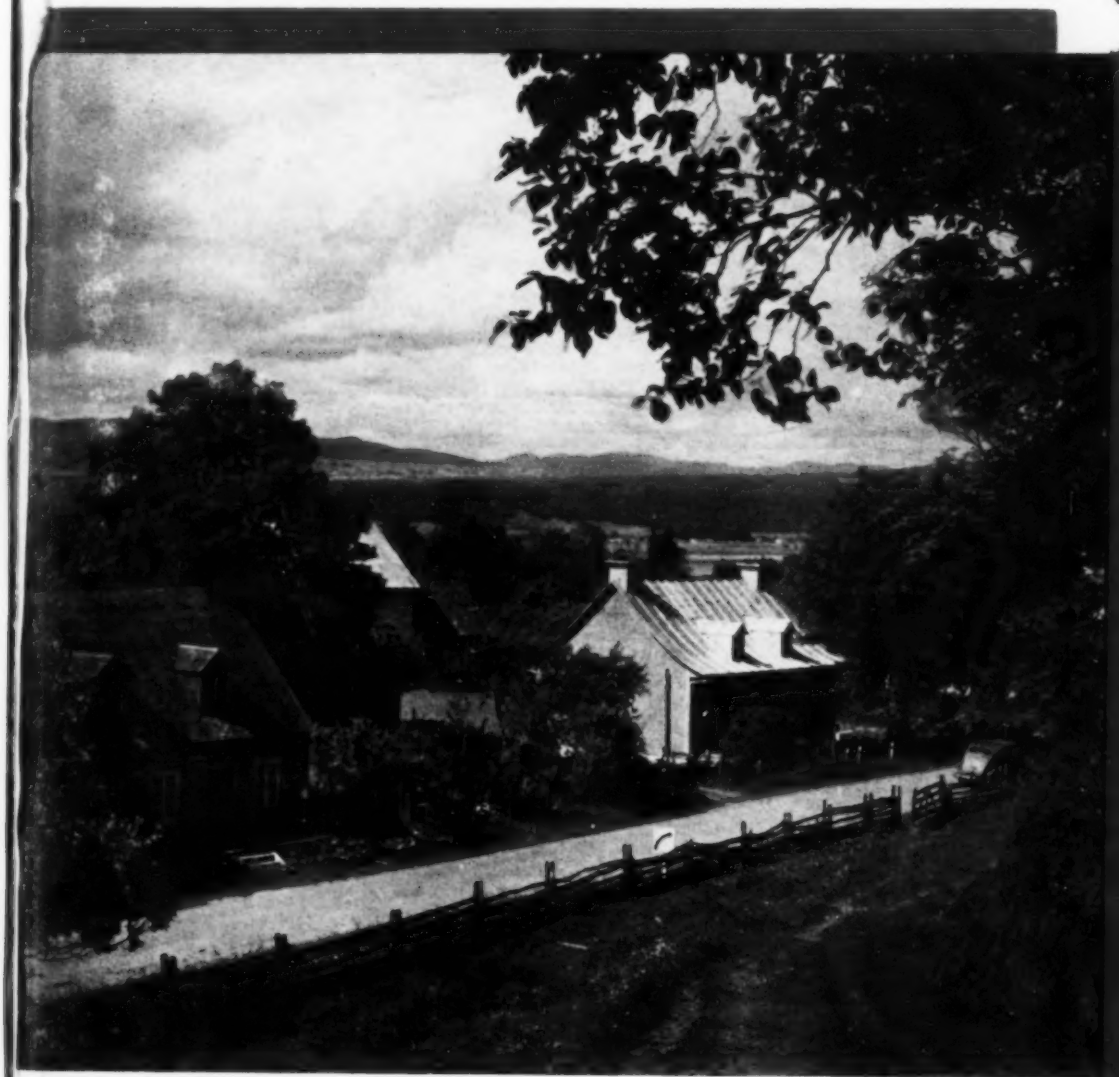
CANADIAN GEOGRAPHICAL JOURNAL

APRIL
1944

VOL. XXVIII
No. 4

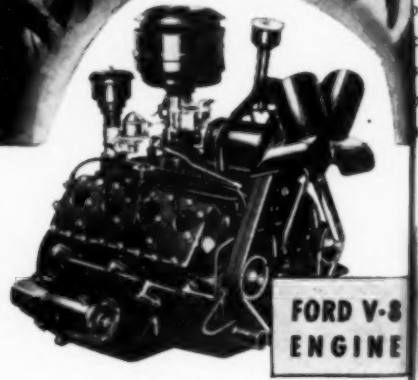


PUT VICTORY FIRST
BUY VICTORY BONDS

$3.00 A YEAR

35c A COPY

On the Fighting Front ...on the Home Front



A great engine doing a great job

As ALLIED ARMIES push forward their offensives in various parts of the world, Canadian military motor vehicles continue to play an important part in the transport of men and supplies. Along the rim of North Africa they carried a large part of the advancing Eighth Army. Over shell-torn roads and through deep mud, they carried the main weight of the Canadian advance in Italy, and a large proportion of the British Eighth Army as well.

In this gigantic transport undertaking, Ford-built cars, trucks and universal carriers have borne a substantial share of the load. In Canada too, Ford buses have played an important part in solving our wartime transportation problem. The power plant which drives these Ford vehicles on the home front and on the fighting front is the Ford V-8 engine.

At home and abroad, the Ford V-8 Engine is famous for its smooth, surging power and rugged reliability. It is a thrifty engine, economical of gas and oil, and it keeps on eating up the miles with the very minimum of care. In war or in peace, it's a great power plant. Certainly it's the engine you'll want in your post-war car.

FORD MOTOR COMPANY FORD V-8 AND MERCURY CARS, FORD TRUCKS, FARM TRACTORS, BUSES **OF CANADA, LIMITE**

"A NATIONAL ELECTRICAL SERVICE" means . . .

A trained PERSONNEL imbued with the SPIRIT of service — supported by the FACILITIES and the ORGANIZATION to deliver electrical goods — WHERE required — WHEN required.

This Ship

WOULD HAVE BEEN DELAYED . . .

Strange but important demands are made upon Canada's facilities in wartime—demands that can only be answered by a *national* electrical service. Canada's ship building programme, for instance, has drawn heavily upon our resources of manufacture, man-power; our knowledge of "where-to-find-it-if-we-don't-make-it". Precious time is saved by the ability of our 23 distributing houses to quickly locate and supply "bits and pieces" — necessary components of electrical equipment from the simplest switch to the most involved secret device. Thus, through our distributing organization, we have contact with, and call upon, the resources of as many as one hundred suppliers and sub-contractors whose efforts speed the building and repair of Canada's ships thus materially aiding Canada's part in the war.

IN WAR AND IN PEACE

Northern Electric

SUPPLIES—

Wires and Cables
Telephones
Power Apparatus
Radio Equipment for Air and Land
Electronic Devices
Illumination
Electrical Supplies
Household Appliances
Overhead and Underground Equipment

40—S441

Northern Electric

COMPANY LIMITED

A NATIONAL ELECTRICAL SERVICE

HALIFAX, SAINT JOHN, N.B., QUEBEC, TROIS RIVIERES, SHERBROOKE, MONTREAL, OTTAWA, VAL D'OR, TORONTO, HAMILTON, LONDON, WINDSOR, KIRKLAND LAKE, TIMMINS, SUDBURY, PORT ARTHUR, WINNIPEG, REGINA, CALGARY, EDMONTON, VERNON, VANCOUVER, VICTORIA

The Medal Johnny hasn't won

Johnny isn't fighting for medals . . .

Johnny doesn't even *like* fighting! He doesn't like sleeping in a slit trench instead of his own comfortable bed. He doesn't like killing other men. But he's doing it.

He faces death day after day. Sometimes he lives on nothing more than "iron ration." There's little chance for sleep. The enemy is always there, just out front.

Johnny hasn't won a medal. He hasn't been cited for "gallantry in the face of the enemy." He's just another soldier who is fighting bravely. After all, that's his duty. He's just another soldier willing to pay *his* price for *your* freedom!

Johnny asks only one thing . . . that the folks back home, *all* of them, pitch in to support him and the others like him.

He's willing to *give* everything. He expects *you* to *lend* your dollars. That's not much to ask, is it?

Get ready now to buy Victory Bonds.

NATIONAL WAR FINANCE COMMITTEE

1922-6

THE *Miracle of Radio* TOOK FORM

ABOUT 1922 came the dawn of a great new era in communications and entertainment. Suddenly the public awakened to the great new possibilities of radio. In just a few months, radio became a part of everyday life.

The Canadian Nickel industry, with its mines and plants still partially idle because of loss of wartime markets in 1918, saw an opportunity to find new markets for Canadian Nickel in the growing radio industry.

Soon Canadian Nickel was playing an unseen but vital part in millions of radio tubes and other parts of broadcasting and receiving sets throughout the world. Another step had been taken in rebuilding the markets for Canadian Nickel beyond their wartime peaks.

• • •

Today Canadian Nickel is again devoted to war purposes and again the industry looks to the future with confidence. Plans are ready to develop and expand old and new peacetime markets, so that the Nickel industry may continue, through its own initiative and enterprise, to make still greater contributions to Canada's welfare.

NICKEL MONEL

Canadian Nickel

THE ACHIEVEMENT OF THE PAST IS THE PROMISE OF THE FUTURE

THE INTERNATIONAL NICKEL COMPANY OF CANADA, LIMITED

25 KING STREET WEST, TORONTO

CANADIAN GEOGRAPHICAL JOURNAL

Published monthly by
The Canadian Geographical Society
at 2151 Ontario St. E., Montreal

Editor – *Gordon M. Dallyn*

This magazine is dedicated to the interpretation, in authentic and popular form, with extensive illustrations, of geography in its widest sense, first of Canada, then of the rest of the British Commonwealth, and other parts of the world in which Canada has special interest.

Contents

APRIL 1944 VOLUME XXVIII No. 4

COVER SUBJECT:—Picturesque and quaint Island of Orleans — Photo by J. W. Michaud

PAGE

AGRICULTURE IN QUEBEC: PAST — PRESENT — FUTURE
by HON. J. ADELARD GODBOUT 157

POINT PELEE—A CANADIAN PORT FOR BIRDS by L. L. SNYDER . . . 182

THE GANARASKA WATERSHED SURVEY by A. H. RICHARDSON . . . 188

MARITIME DYKELAND REHABILITATION by E. S. ARCHIBALD . . . 198

EDITOR'S NOTE-BOOK VII

AMONGST THE NEW BOOKS IX

• • • •

The articles in this Journal are indexed in the *Reader's Guide to Periodical Literature* and the *Canadian Periodical Index* which may be found in any public library.

The British standard of spelling is adopted substantially as used by the Dominion Government and taught in most Canadian schools, the precise authority being the Oxford Dictionary as edited in 1936.

Contents of this Journal are copyright.

Address all communications regarding change of address, non-delivery of Journal, etc., to the publication office, 2151 Ontario Street, East, Montreal, Canada, giving old and new address. On all new memberships, the expiry date will be printed on wrapper containing starting number. This will constitute a receipt for subscription.

Membership in The Canadian Geographical Society is $3.00 per year in Canada and other parts of the British Empire, which includes delivery of the Journal, postpaid; in United States, Mexico, France, Spain, Central and South America, $3.50; in other countries, $4.00. Make membership fee payable at par in Ottawa.

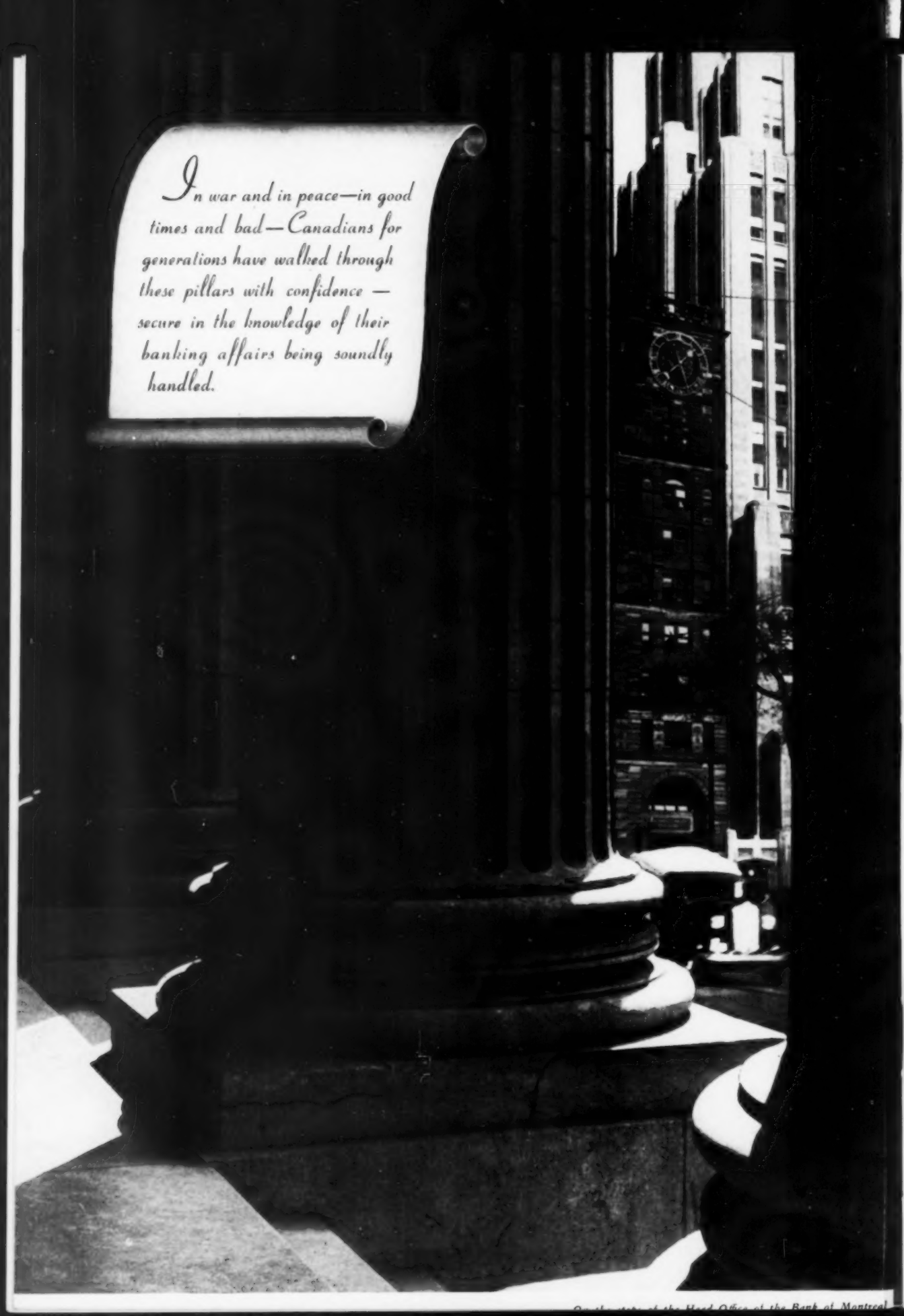
Member Audit Bureau of Circulations.

Special Representatives:

Ontario: F. A. Dallyn, 21 King Street, E., Toronto, (Tel. EL. 2863)
Quebec: F. A. Dallyn, 2151 Ontario Street E., Montreal, (Tel. FR. 1722)
Europe: Norah C. Perry, 5 Upper Dagnall Street, St. Albans, Herts., England

Entered as second-class matter at the Post Office, Montreal, Canada.

PRINTED IN CANADA


In war and in peace—in good times and bad—Canadians for generations have walked through these pillars with confidence — secure in the knowledge of their banking affairs being soundly handled.

Monument to Louis Hébert (first Canadian settler) near Quebec City Hall

AGRICULTURE IN QUEBEC

Past — Present — Future

by **Hon. J. ADELARD GODBOUT**

AMID the distractions of our intricate modern life, some historical details are bound to be forgotten. Most of us are aware that the City of Quebec played a leading part as the cradle of North American civilization; but that it was also the *birthplace of Canadian agriculture* is not so generally known; yet that is a fact of some importance with which every Canadian farmer should be familiar. Scarcely a stone's throw from my office on Parliament Hill lies what was over three centuries ago the *first farm* in New France—a name then given to a vast geographical expanse including the whole of the St. Lawrence basin.

For some years after the founding of the city by Champlain in 1608, no attempt was made to cultivate the soil. In fact, the sponsors of the new colony would not allow land to be cleared for farming. Their only interest was in furs and they feared that settlers would spoil their trade by driving away the fur-bearing animals. So the birth of Canadian agriculture was delayed nine years, and it was not until 1617 that the first attempt to till the soil was made by Louis Hébert, a former Parisian apothecary, who was thus the pioneer of that great agricultural community which has since covered Canada with over half a million farms and gradually transformed a land of snow and ice into one of the world's richest storehouses.

The land conceded to Louis Hébert by King Louis XIII measured ten *arpents* and covered a large part of what is now the Upper Town, within the old walls. In that first year, 1617, only a few handfuls of seed could be sown. Wheat was probably the first cereal to defy our northern climate.

Farming was a primitive business in those early days. There were no farm implements or draft animals, and Hébert and his son-in-law, Guillaume Couillard, had to manage as best they could with such simple hand tools as axe, hoe and sickle. There is some doubt as to just when draft animals first appeared in the colony, but it is known that the first plough arrived early in 1627 and was used by Couillard himself on the 27th of April in that year.

Agricultural development was slow. There were several reasons for this. In the first place, it was the policy of the mother

Power wheel of an old mill at Les Eboulements

country to keep New France as an outlet for her surplus stock only. Then, the colonists belonged to the artisan class, and it was only by a process of gradual evolution that their interests were turned to agriculture. Finally, the life was incredibly hard. The struggle against nature was bitter and unceasing and by no means always successful.

While agriculture languished, the newcomers were forced by dire necessity to turn for sustenance to the resources of forest and stream. They learned by the slow process of trial and error, and the skill and knowledge so acquired materially helped New France to become self-supporting. The rigours and perils of this precarious existence stimulated resourcefulness, daring and thrift. Often the fruits of a whole season's toil were ruined by early frosts. Often the farmer was forced to keep constant watch on the woods, musket in hand, ready to repel the prowling redskin. Colonial wars added their heavy burden to an already hard life. The early colonists made good and sturdy soldiers, readily answering the call to defend their land and their homes. Such hardships, far from daunting the French-Canadian, served rather as a spur to his ardour and strengthened his resolution.

The spirit of adventure tempted many sons of the first colonists to penetrate the vast regions beyond the settlements. Some chose to supply the fur trade and became expert trappers. The picturesque and romantic *coureur des bois* was a product of the times. A long line of discoverers explored the wilderness, pushing out from the St. Lawrence to Hudson Bay, the Great Lakes and the Ohio and Mississippi valleys. When later a demand for lumber came from Europe, Canada did her part and the versatile *habitant* became a first-class lumberjack. Meanwhile, thrown largely on his own resources, he learned to supply with his own hands all that was needed

within and without his home. Proofs of his skill at handicrafts are to be found in many old farm houses. At times he produced works of real artistic merit, as may be seen to-day, especially in the decoration of churches.

Small industries, such as grist-mills and saw-mills, sprang up in all important localities, local streams being used to provide power by means of simple but efficient devices, some good examples of which are still in operation.

Since, by force of circumstances, nine-tenths of the population were normally engaged in farming, the clearing of land for cultivation soon came to rank as the chief occupation of young men. *Défricheurs*, of the Père Chapdelaine type described in Louis Hémon's celebrated novel, are still at work in some parts of Northern Quebec and Ontario.

The system of land tenure in the old days was perfectly suited to the requirements of the times. Large tracts of land were granted to *seigneurs* who parcelled it out to settlers in return for feudal dues and services, so that the colonists became established in groups and could help one another in case of emergency, the seigneur providing facilities for the men under his authority. But when, in course of time, the need for local defence disappeared, private ownership came to be regarded as the normal system of land tenure. The change was slow and difficult but the seigniorial system gradually died out.

Agriculture continued to be the chief occupation of the people until the middle of the nineteenth century. In all parts of the country producers of food made up the bulk of the population, with a small minority of tradesmen, clergy and professionals. Industry was confined to essentials or existed as a mere adjunct to the cultivation of land. Then the Industrial Revolution, which transformed England from a farming country to a land of factories and shops in the latter half of the last century, was followed by a similar change in the United States and Canada.

For a long period, from the founding of Quebec until about 1870, Quebec farms were operated almost exclusively on a self-sufficiency basis. This was largely due to lack of markets and difficulties of transportation, though other factors had an important bearing on farming practices. The difficulties of the early days of slow adjustment to a new environment have already been mentioned. As the farming population increased the colony gradually became self-supporting, as far as food production was concerned. Each farm strove to become economically independent. Family

Ancient wind-mill at Ile aux Coudres—still in operation

The old Marchand farm house at Terrebonne

economy was the rule for over two hundred years when, save for a few farmers in the immediate vicinity of Quebec, Three Rivers and Montreal where there was a limited market for certain products, production remained geared to family requirements. Wheat was the staple of life and appears to have been the only important field crop for a very long time. For the sake of clarity this period may be divided into four parts.

From Early Days to 1850

From the beginning of the colony to the middle of the last century, agriculture underwent a process of slow evolution. There was a constant demand for new farms. To meet that demand and to keep pace with the rapid growth in population, more and more land had to be cleared. Census figures recorded by various governors and intendants give the total population as 3,215 in 1666; 7,400 in 1679; 11,562 in 1688; 16,431 in 1706; 24,434 in 1720, and 42,701 in 1739. In 1754 the rural population was 42,200 out of a total of 55,009, or 76.7 per cent of the whole. It reached nearly 80 per cent in 1765, when peace had been restored and the people returned to their normal occupations.

Apart from grain, crops were limited to a few vegetables. Orchards and small fruits held a fairly important place on every farm. Flax, hemp and tobacco were the only industrial plants grown, and these were only cultivated in restricted areas.

Farm animals were scarce. Such as could be had were reserved for family use with an occasional exchange in city or town. A few head of the Normandy breed of dairy cattle are believed to have been brought to New France by Champlain himself, in or shortly after 1608. The first horse came as a gift to the Governor

de Montmagny in 1647. Many factors retarded the development of farm stock. In the first place forage was scarce and the farmer had to rely entirely upon very limited quantities of natural and rough fodder to feed his animals during the long winter months. Then European breeds had to be adapted to an entirely new environment, which is always a slow process. These two factors alone were sufficient to account for the slow progress of animal husbandry over a period of fully half a century.

After 1660 the French Government made a commendable effort to improve the situation. In that year Colbert, the great French Minister, shipped to the colony good specimens of the dairy breeds of Normandy and Brittany; and in 1665 the intendant de Tracy brought with him a considerable number of milch cows. The feeding of farm animals had already greatly improved, for a census taken by the intendant himself in 1667 shows a total of 3,107 head of cattle of various kinds, including beef and dairy cattle and draft animals. There were apparently no further importations. The original stock became adapted to its new environment, and from it sprang the only indigenous strain of cattle this country has produced, now known as the French-Canadian breed.

Horses came later. Apart from the gift to de Montmagny already mentioned, the first lot, consisting of two stallions and ten mares, was sent out by Louis XIV in 1665. Other shipments followed in 1667 and 1670. They all came from Normandy and belonged to an all-purpose breed well suited to the needs of the colony. In course of time these animals produced the well-known French-Canadian breed which is still widely distributed throughout the Province of Quebec.

Other farm animals were imported from time to time. In 1663 Pierre Boucher stated in his report to the King on the state of agriculture that the farm animal population then included oxen, cows, sheep, hogs, turkeys, pigeons, dogs, cats and even rats, "all imported from France", he humorously added. According to a census taken in 1765, there were then in Canada 13,500 horses, 49,900 cattle, 28,000 sheep and 28,600 hogs. A comparison of these figures with those of the census of 1844 shows a marked progress in animal husbandry, for at the latter date there were 146,700 horses, 469,900 beef and dairy cattle, 602,800 sheep and 197,900 hogs.

Soil management seems to have been unknown or sadly neglected for a very long time. Lord Durham in his report deals at length with the farm practices then in vogue. He describes them as exhaustive of soil fertility and decidedly primitive. Constant depletion of the land resulted in a gradual decrease in yield. Soils once highly fertile produced a mere fraction of their former crops. For instance, in 1830 the average yield of wheat had shrunk to seven bushels per acre. Other crops showed a similar falling-off. Moreover, the Hessian fly wrought havoc in the wheat fields, still

Grist-mill still humming with activity after 200 years.

Typical colonist establishment, McWatters, Temiscamingue

further lowering production, till it reached a point where for thousands of people in rural districts life on the land was no longer possible. The flight from the soil began between 1845 and 1849 when no fewer than twenty thousand people, mostly farmers and their families, migrated to New England where growing industries offered employment. The situation was so grave that an immediate inquiry was decided upon by the Government.

Period from 1850 to 1873

The report of the Special Committee on the Agricultural Situation in Lower Canada was presented by Taché in 1850. It said, "The people of Lower Canada are industrious and intelligent, yet they reap from the soil only one-quarter of what it should yield. This is mainly due to a poor system of cultivation. The principal defects in that system are:

1. Lack of proper crop rotation;
2. Lack or wrong use of manure;
3. Inadequate management of animals;
4. Excess of water in certain localities;
5. Insufficient care given to grass lands and the cultivation of leguminous foods for animals;
6. Inadequate farm implements."

The author of the report recommends as remedies:

1. Organization of county agricultural societies;
2. Exhibitions, with prizes for the best exhibits;
3. Agricultural schools and model farms in connection with colleges and academies;

A charming habitant family group, Cranbourne, Dorchester County.

4. Publication of books on elementary agriculture;
5. Publication of a Journal of Agriculture and establishment of a library;
6. Appointment of agricultural superintendents.

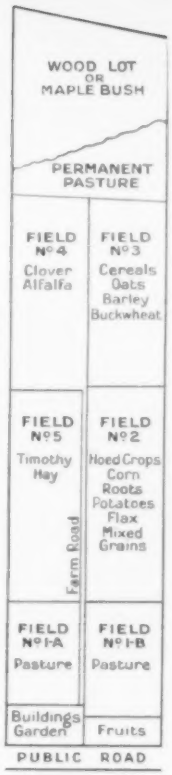
The cultivation of wheat was rendered more and more difficult by repeated plagues of insects and exhaustion of the soil, so wheat was gradually replaced by oats, barley and buckwheat. Flour, brought in from the south, was cheap. The trend was now toward larger herds, and the dairy industry was stimulated by improved local markets and increasing demands from Great Britain.

The period was one of transition. Canada was undergoing a process of economic evolution. Experiments in trade between the United States and Canada were being made, and the effect of these, both beneficial and detrimental, were felt by the farmers of Canada. Under the Elgin-Marcy reprocity treaty, in force from 1856 to 1866, Quebec farmers found a ready market for their field crops and enjoyed a brief period of prosperity. Land was more thoroughly cultivated and old implements were replaced by new and more efficient ones. Mechanical mowing machines and threshers were in use after 1860. Then, when the American market was shut off by the barrier of higher tariffs, the processing of crops had to be carried out on the farm to a much greater extent than before. Though butter was a strictly home-made product, the supply exceeded the requirements of the local market, and the surplus was exported overseas. During this period the first signs of the development that led to the great dairy industry of to-day became apparent.

Period from 1873 to 1912

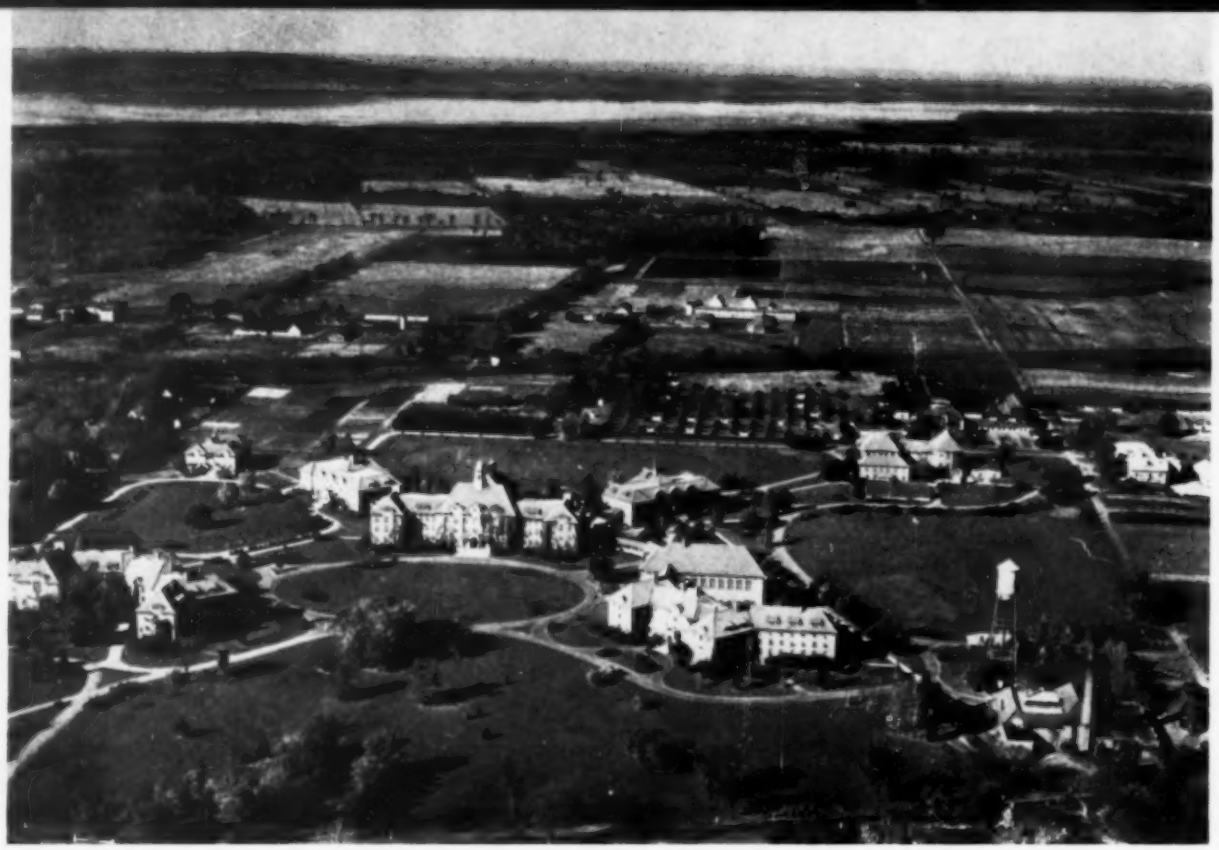
The economic crisis that spread throughout the world from 1873 to 1876 and lasted nearly twenty years brought difficult times for farmers. A new and powerful current of migration carried many thousands of people from our rural districts to the manufacturing towns of New England. Those who remained faithful to the land of their ancestors felt the need to improve their farming methods. The trend was now toward mixed farming and dairy farming. The first cheese factory was built at Dunham in Missisquoi County in 1865, and the first butter factory began operations at Athelstan, Huntingdon, in 1873. They were soon followed by many others.

Family economy gradually gave place to exchange economy. With better care, more attention to the maintenance of soil fertility, and crops diversified through the introduction of legumes, the Quebec farm was in a better position to survive and to meet competition. Improved markets for dairy products led farmers to give thought to the improvement of their herds. Breeds famous for their high milk production had been coming in slowly. Ayrshires from 1821 on and Holsteins from 1881. They were now imported *en masse* and led to a marked increase in the manufacture of butter and cheese. The dairy herd became



TYPICAL QUEBEC FARM
120 ACRES
5 YEAR ROTATION

Eight generations of L'Heureux have lived on this farm at Charlesbourg.
Photo by Hamilton Wright



Macdonald Agricultural College, Ste. Anne de Bellevue

the hub of every farm, with crops regulated to meet its requirements. There was a steady increase in the number of cattle, from 783,000 head in 1871 to 1,365,800 in 1901, and 1,453,300 in 1911; but more gratifying even than mere numbers was the awakening of a proportion of farmers to the possibilities of scientific selection and breeding. Pure stock breeders are now to be found in all agricultural districts, playing an important part in the improvement of local herds.

Cash crops also came into the picture. Around Montreal, many commercial orchards were either bearing or being planted, while market gardening flourished in suitable places close to city markets.

On the whole, this period was one of change, characterized by new developments and many false starts before the proper course was found. There was still much room for progress, especially in the improvement of soil, farm management and other phases of agricultural technique.

Period from 1912 to 1939

This period between the two World Wars was characterized by two important advances: a great industrial development and a sweeping reorganization of ag-

Superior School of Agriculture, Ste. Anne de la Pocatière

Oka Agricultural College, LaTrappe (affiliated with the University of Montreal)

riculture on modern principles. During these years the economy of the Province of Quebec was completely changed by a veritable industrial revolution. The utilization and processing of raw materials derived from forest, mine and soil led to a sudden and unprecedented growth of industrial cities. Migration to the United States fell off to a mere trickle, but the shift of population away from the land continued. Attracted by good wages, rural workers flocked to city and town, with the result that the distribution of population was completely reversed. Before the first Great War, over sixty per cent of the inhabitants of Quebec lived in the country. By 1939 sixty per cent were city dwellers.

This shift in population, while reducing the number of agricultural workers, at the same time increased the demand for their produce, so the Quebec farmer was faced with the necessity of rapidly increasing his output. If he failed in this he would be doomed to see his market invaded by producers from neighbouring provinces and states. The Government took the situation in hand.

Prior to 1912 the Department of Agriculture had been merely an office for the distribution of grants to agricultural societies and money for prizes at exhibitions. Agricultural extension was carried on in a very small way with a limited staff. The Federal Agricultural Instruction Act helped Quebec, as well as the other provinces, to set up proper technical branches to teach new farming methods. The year 1912 is important in the history of agricultural education in Quebec, for it was then that the first university degrees in agronomy were conferred by the French schools at St. Anne and Oka, following Macdonald College where the first class graduated one year earlier. From amongst these trained agriculturists, the Department was able to pick up a few men who were put in charge of extension work in selected counties. Their number increased from year to year in keeping with the demand. In 1934 the province was divided into twenty-one agronomic regions, each headed by a "regional agriculturist" with six or eight local agronomists under his supervision. Each local agronomist is responsible for six or seven parishes or about a thousand farmers.

Concurrently with the Extension Service, other branches were set up to take charge of field crops, animal husbandry, horticulture, rural economics, etc. (Details of the organization of the various branches and the scope of their work will be found in the annual reports of the Minister of Agriculture.) The technical staff was recruited from amongst the graduates of the three superior schools of agriculture. Specialists in various subjects have been trained in the best institutions of this continent

Office building of the Provincial Department of Agriculture, Quebec City

Lush clover crop in characteristic Kamouraska setting

Harvest scene | Temis

and abroad, where the numerous scholarships granted by the Government enabled them to proceed to higher degrees. Many followed post-graduate courses at Cornell, Amherst, Paris, Iowa, Guelph and other centres.

Let us now review the developments of the period between the two wars, considering first Government policies and then the farmer's response.

Government Policies

Under this head we shall discuss briefly the important methods devised to teach, guide, assist and organize farmers.

Education—All agricultural schools receive financial aid from the Government. Besides the three superior schools mentioned above, there are five secondary schools, twelve elementary or practical training schools and six orphanages with agricultural departments. Many of these schools operate farms where the students are given an opportunity to become familiar with practical agriculture. The Provincial Dairy School trains butter and cheese makers and inspectors of dairy products, besides conducting experiments. There is a school of domestic science in each region. Agricultural training is also given to girls at some regional schools during the summer months.

But the Government does not rely entirely on teaching institutions. It has consistently offered instruction to farmers by other means such as winter short courses, lectures and demonstrations, exhibitions, bulletins, posters, films, regular radio broadcasts and clubs and societies. To supplement more agricultural theory as disseminated by these means, the Government has resorted to various expedients designed to familiarize farmers with the practical application of the principles taught.

Demonstration Farms—The first demonstration farm was established at La Pérade, in Champlain County, in 1922, and others followed in subsequent years until there was one in each county. They have proved a powerful means of persuading farmers of the excellence of modern agricultural methods.

The owner of the farm would bind himself by contract to follow the instructions of the agronomist. For instance, he would agree to drain his land if necessary, to use a system of crop rotation suited to his farm, to control milk production, to keep accounts, to use only pure-bred reproducers, to feed his animals according to definite rules. It was a five-year plan. The whole farm was transformed during that period at the rate of approximately one-fifth each year. It meant that fields, herds and buildings as well as the system of farm management had to be completely changed or radically readjusted. An annual grant helped the owner to make costly improvements such as the installation of underground drainage and the purchase of high-class sires.

Such was the success of this practical method of education that the first farm demonstration contract had scarcely come to an end in 1927 when sixty farmers in Champlain County offered to place their farms under the direction of the agronomist. They felt that if one very ordinary farm could be so completely transformed in five years, the system had proved its merits and they were ready to adopt it and pay the whole cost themselves. From Champlain the movement spread to every rural county in the province.

The Government took advantage of this enthusiasm to inaugurate what is know as the "Farm Improvement Competition" which, in its essence, is the demonstration farm system applied to

scene Temiscamingue County

Sturdy farmers have conquered part of the Appalachian plateau in Beauce County.

twenty or more farms in each agronomic division on a competitive basis. Each farm in the competition is an object lesson to the other farmers, many of whom eagerly await their turn to enter. Seventy-one of these competitions have now completed the five-year programme. Sixty-nine more, with a total enrolment of 1,676 farmers, are now in progress. To maintain interest among the competitors, each farm undergoes an annual inspection. Those obtaining more than sixty-five per cent of the marks obtainable receive a special grant of twenty dollars. At the end of the fifth year final judgment is passed by a special jury and a total of one thousand dollars is distributed amongst the twenty best competitors according to the number of marks obtained.

An important feature of this work is the accounting system that is obligatory for every farm entered in a competition. This has many advantages, the most obvious being that it gives the farmer as accurate information as it is possible to obtain on the following points:

1. The amount and the cost of human labour expended on the farm as a whole, and for each crop or department;
2. The extent to which draft animals and machinery are used and the cost involved;
3. Rental costs for animals and crops;
4. Production costs for each crop or department.

What, it may be asked, are the specific results obtained? A few figures will supply the answer. Let us take the case of the thirty-five farms of St. Félix de Kingsey in Drummond County, which took part in the local contest there from 1935 to 1939. Here are some typical figures, expressed as averages per farm: increase in total revenue, 77.2 per cent; increase in number of milk cows from 13.3 to 16.2 units; increase in total milk production, from 46,165 pounds to 91,935 pounds; increase in milk production per cow, from 3,471 to 5,633 pounds; increase in production of pork, from 1,911 to 3,547 pounds; increase in the area sown to field crops, from 66 to 83 *arpents* or 26 per cent; increases in field crop yields ranging from 7 per cent to 30 per cent.

Many other and even more striking instances might be used to show that farm contests such as those described are the very best means of educating the adult farmer. Of course, a farm cannot be completely revolutionized in the short space of five years, but it is possible in that time to familiarize the farmer with the fundamental principles and their practical application. He learns enough to carry through to completion the improvements planned at the outset, and sees enough of their beneficial effects to convince him that the work involved is worth-while. Though the competition is over, the agronomist is always at hand, ready to help him in case of need.

Apart from whole farms managed by agronomists, hundreds of demonstration fields, scattered throughout the province, were operated between 1896 and 1933 when they were abandoned in favour of other policies. They were particularly useful in improving the production of the leguminous crops. Through them thousands of farmers learned the value of good tillage, adequate drainage and fertilization, the liming of acid soils and other processes, and new crops such as alfalfa, roots and lentils were introduced on many farms.

Soil Improvement—Though often omitted from the list of a country's natural resources, soil should undoubtedly occupy the first place. Canada is a rich country because of its agricultural possibilities, upon which, in the last analysis, all other

A picturesque farm at St. Ours, Richelieu County

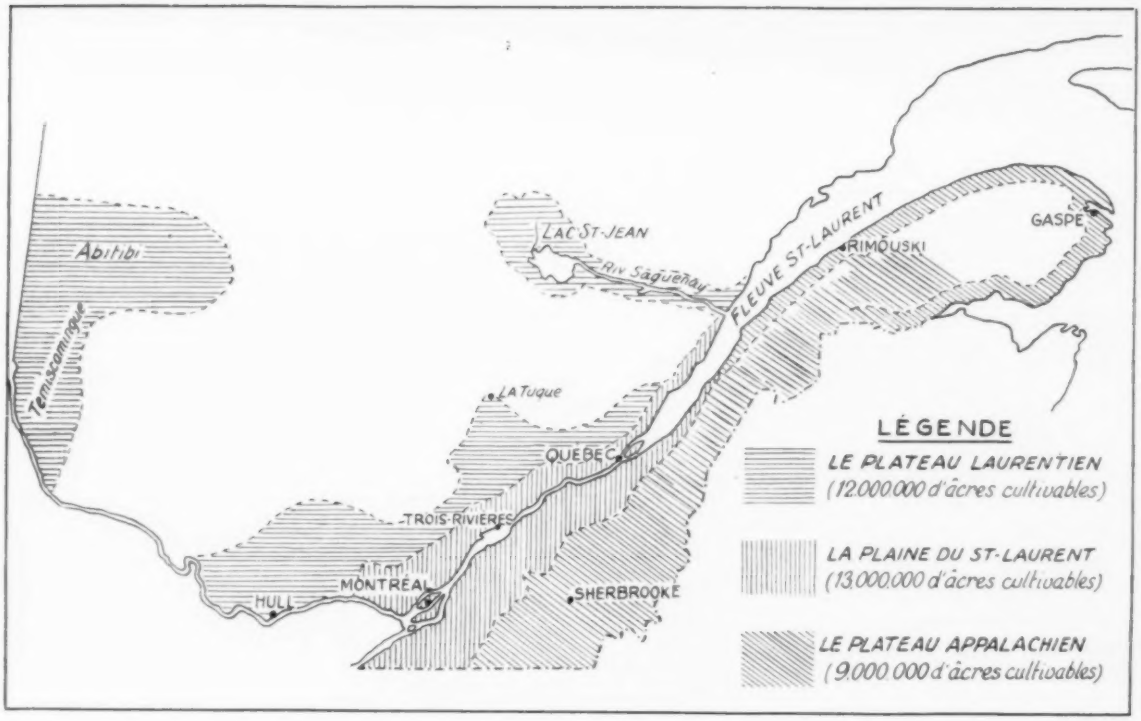
human activities are dependent; and soil is the basis of agriculture. The primary importance of soil, of the upper layers of arable land, should never be overlooked. Unfortunately, it is often disregarded through ignorance or indifference. In North America, Canadians and Americans alike have been guilty of such neglect with the result that they are now confronted by the gigantic task of restoring vast tracts of what may be termed squandered land to productivity. To any one conversant with agricultural problems, soil conservation and restoration are known to be of the very first importance. Dr. H. H. Bennett, Director of the Soil Conservation Service of the United States, recently valued an acre of surface soil at a minimum of $4,000.00. No other renewable natural resource was ever rated so high. In the course of the last twenty-five years many plans have been devised with a view to stimulating the basic improvement of land.

The Department of Agriculture has striven to preserve the soil, knowing it to be the fundamental national asset. Soil restoration is a necessity in nearly all older settlements, where two centuries of poor farm management have resulted in the partial exhaustion or even deep impoverishment of land that was formerly highly fertile. By means of grants, subsidies, loans of machinery and mechanics, partial payment of transportation costs, the setting up of limestone crushing plants, cheap distribution of fertilizers, encouragement in the building up of organic matter, control of sheet erosion, and other means, Quebec has striven hard to restore the land to its original productivity, but much still remains to be done.

Agricultural Geography

At this point it may not be out of place to give a brief account of the situation and extent of the various regions in the Province of Quebec which are either devoted to farming or suitable for that purpose. Such land, according to geologists and agrogeologists, falls naturally into three geographical divisions:

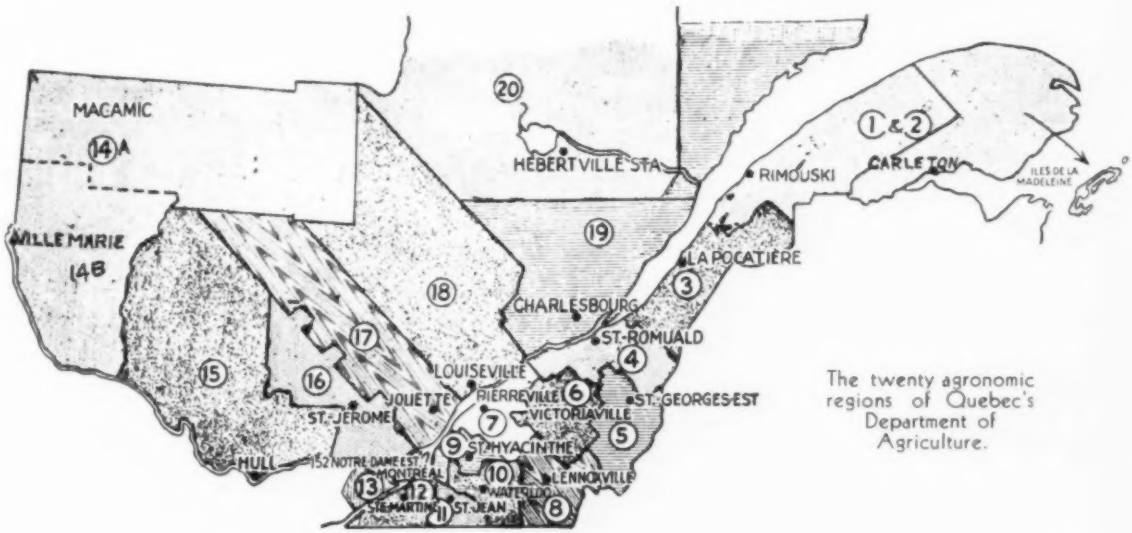
1. The St. Lawrence plain, extending north, south and west from Montreal, and also easterly in a narrowing strip on either side of the river. This region has an area of about 13,000,000 acres, nearly all occupied and to a great extent improved. The oldest settlements were all made in this region which comprises the most fertile soils in the province. Over 50 per cent of Quebec



farms are located in the St. Lawrence plain.

2. *The Appalachian plateau*, comprising the Eastern Townships, the highlands south of the St. Lawrence and the Gaspé Peninsula, a total area of some 15,000,000 acres of which about 9,000,000 acres are tillable.

3. *The Laurentian plateau*, situated in the northern part of the province, above the St. Lawrence plain. The very considerable mountainous part of this region is given over to forests and will probably remain so, but agricultural lands of a total estimated area of 12,000,000 acres are to be found in the neighbourhood of Lake St. John and in the Abitibi-Temiscamingue basin. About 3,000,000 acres of this land are already occupied, leaving for future colonization some 9,000,000 acres, mostly in Abitibi.



The twenty agronomic regions of Quebec's Department of Agriculture.

A promising field of Green Mountain potatoes, Champlain

Raspberry patch with attractive hou[illegible]nd b

In these three regions the cleared land used for agricultural purposes is probably less than 12,000,000 acres, of which 7,000,000 acres are sown to field crops. There is only limited room for expansion on existing farms, and no expansion is possible except by draining excess waters or removing large quantities of stone. A special policy has been designed to further this work and so help the farmer to add to his fields each season a few acres that have been idle for many years.

Mixed Farming—It has already been stated that mixed farming is the rule in Quebec. It is the system best adapted to climatic and economic conditions in the province. With its longer winter and shorter growing season, Quebec cannot compete with Ontario as far as variety of produce is concerned, yet hoed crops are fairly well diversified and cash crops are becoming very popular. For instance, Quebec grows more potatoes than any other province, its seed grain production is progressing very satisfactorily, and flue-cured tobacco, which seemed out of the question a short time ago, is now perfectly at home in the light soils of the Joliette-Berthier district.

Horticulture—Great advances have been made in horticulture during the last quarter of a century. In 1920, only 8,467 acres were grown in vegetables on a commercial basis; in 1938, the area was 48,650 acres, an increase of 475 per cent. In the same period the value of vegetable crops rose from $1,672,152 to $7,265,000.

Twenty-five years ago our canning factories could be counted on the fingers of one hand. Just before the war there were eighty such establishments in operation, and the value of their total output amounted to nearly $10,000,000.

Quebec fruits are well known for their quality and flavour. The demand for them is constantly increasing, and, to meet it, increased areas are planted each year, especially of strawberries and apple trees. Six thousand acres of new orchards have been planted since 1930, and some of these are now beginning to bear. Our apple crop, which was only 300,000 bushels in 1925, reached 1,000,000 bushels in 1939. The output is not yet equal to the demand.

Typical Quebec tobacco plantation, Lanoraie Station

tive hou nd barn in background, St. Pierre, I.O.

A flourishing raspberry plantation, Island of Orleans

but very substantial progress has been made in a short time, and there is no reason why a steady increase should not be maintained for another ten years.

Dairy Products—As a dairy province Quebec stands a close second to Ontario. In 1880 there were already eighty dairy factories in the province. In that same year Canada exported 18,535,362 pounds of butter and 40,368,678 pounds of cheese. Since then the production has increased steadily, due in the first place to growth in the size of herds and later to selection of milk cows.

The development of the dairy industry is closely related to the good work done by the Quebec Dairy Industry Society since its inception in 1882. Through its regulations and the activities of its inspectors it was directly responsible for the improvement in the quality of dairy products until 1915, when the Department of Agriculture took charge of the work of supervision. A definite trend toward fewer but larger and more efficient factories has been apparent since 1930. Between that year and 1939 the number of establishments in operation decreased from 1,600 to about 1,150, whereas the average output increased substantially: by 56.71 per cent for butter and 37.4 per cent for cheese between 1930 and 1941.

In point of quality it may fairly be said that if Ontario is the leader for cheese, Quebec holds first place for butter, having repeatedly won high honours for that product at Canadian and international exhibitions.

Co-operation Between Farmers—For a very long time Quebec farmers took little or no interest in the business aspects of agriculture. They toiled manfully on their land, fought gallantly against the pitiless forces of nature, lived frugally, but remained indifferent to trade and commerce. Their confidence in ordinary trading agencies was often betrayed, and this gave rise to the co-operative movement which has swept the province since 1920.

The co-operative associations operating in the agricultural field alone are a very important factor in Quebec economy today. Starting from scratch in 1915, our co-operative societies numbered 167 with a membership of 12,944 by 1936. Since then they have increased at an astonishing

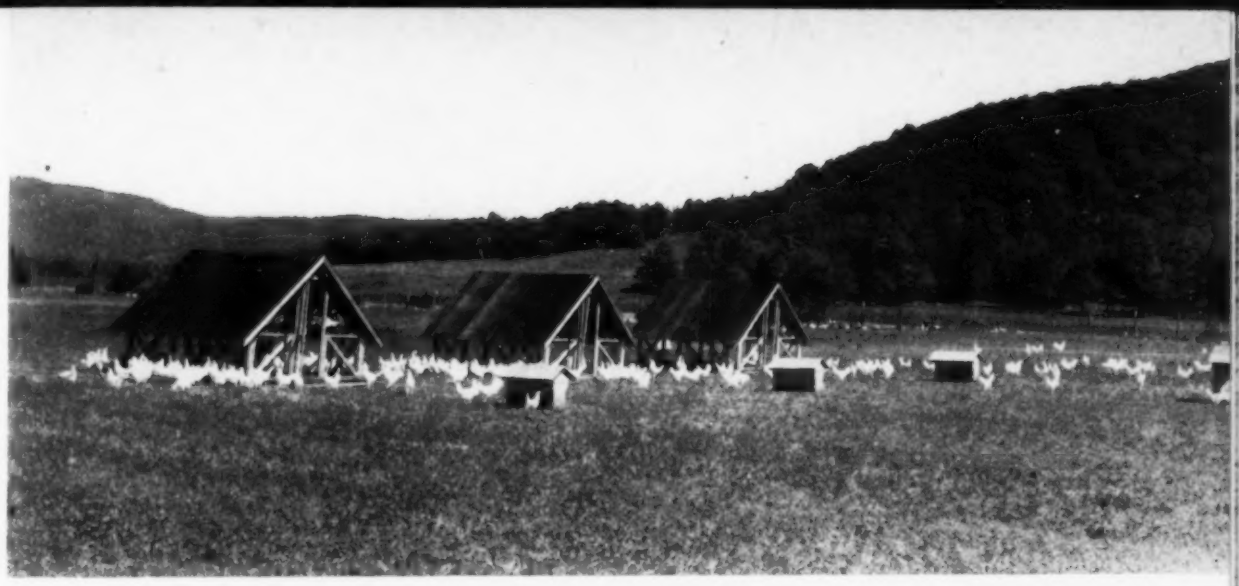
One of the many market gardens in the Montreal region —a fine crop of lettuce at Côte St. Michel

Blossoming season in a McIntosh and Fameuse orchard around the Rougemont Mountain

rate: to 203 societies with 22,663 members in 1939, and 418 societies with 36,761 members in 1942.

Besides the central body known as the *Fédérée* or Federated Co-operative of Quebec, we have two classes of co-operatives: regionals and locals. In 1942 the total business transacted by these two classes was $28,927,987, while the share of the *Fédérée* was over $22,000,000. Impressive as these figures are, they represent only a fraction of the total co-operative effort of which agriculture in Quebec is capable, and it is obvious, in view of present trends, that organization on a co-operative basis will cover the whole field in the course of the next ten years.

Quebec maple trees supply eighty per cent of Canada's maple-sugar products.



Scientific poultry raising as practised on the light soils of St. Raymond, Portneuf County

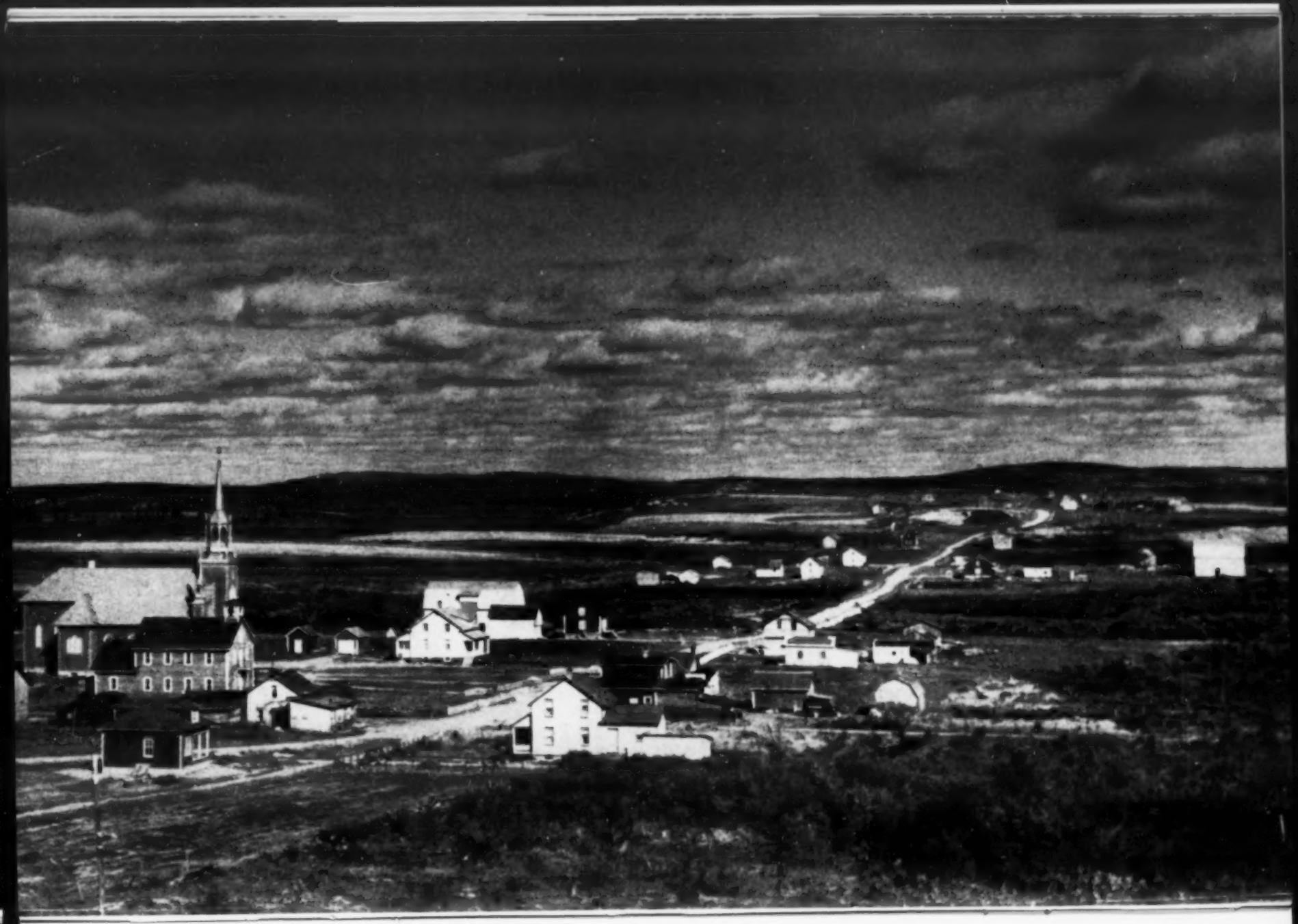
Another widespread form of co-operation quite prominent in country districts is the chain of *Caisses Populaires* or credit unions, founded by Alphonse Desjardins at Lévis, across the river from Quebec City, in 1900, and now established in 795 localities throughout the province. These people's savings banks are giving excellent service to farmers and their various societies, and the day is not far distant when every rural parish and colonization settlement will have its own *Caisse Populaire*.

This brief survey of agriculture in Quebec would be incomplete without mention of the very active and useful women's organizations known as *Cercles de Fermières*. In 1943 there were 850 *cercles*, organized in twenty-two regional federations with a total membership of more than 45,000. They have made an invaluable contribution to the cause of family welfare in rural Quebec.

The Farmer's Response to Government Policies

The popular notion current outside Quebec that our *habitant* is a picturesque, primitive reactionary, could not be further from the truth. Though curiosity hunters and camera enthusiasts, by travelling thousands of miles through the province, may dig up oddities here and there such as ox-horse ensembles and the like, such survivals are exceptions to the general rule. Despite the colourful films circulated outside the province to stimulate the tourist trade, our farmers are modern agriculturists. They revere the past but they live in the present, and they cultivate their land accordingly. Over thirty per cent of them work under the guidance of agronomists. Evidences of improvement in soils, crops and animals are to be found on most farms. An analysis of statistics for the last twenty-five years would reveal to

Sugaring season somewhere in the Eastern Townships



At top:—A typical rural scene in the Province of Quebec: Notre-Dame du Laus

Above:—Agricultural College and grounds, Nicolet

Dairy farm in the hills of the Eastern Townships

Photo by Fred Chivers

any one the beneficial results of modern agricultural practices. Crops have increased both in volume and in quality, herds have greatly improved, and we have some of the best Ayrshire, Holstein, Canadian, Percheron and Belgian breeders in Canada. Farm incomes have increased, not startlingly but at a satisfactory rate. The proportion of Quebec products on the market is rising rapidly. Our farms are established on a sound economic basis. The standard of living has risen steadily,

Ayrshire herd in southern Temiscouata

Holstein herd at St. Augustin, near Quebec City

and this has effectively checked the flight from the land. Agricultural schools everywhere are filled to capacity. Modern equipment is to be found on all farms, though it needs replacement. Before the outbreak of the war there were 12,000 tractors operating in rural Quebec.

War-Time Production

Achievements on the farm front since 1939 have clearly shown that the farmers of Quebec were well prepared to play their part in the battle for liberty. Their contribution to the national agricultural output is something of which they may well be proud and fully measures up to the achievements of Quebec in all other aspects of our common war effort. While tens of thousands of our gallant sons win laurels on the battlefield, while our skilled workmen, and women too, establish unequalled records in war industries, while our people oversubscribe every Victory Loan, the Quebec farmer spares himself no toil in his determination to increase the output of his fields and herds.

At the very beginning of hostilities our rural people resolved, with sound patriotism, quiet courage and firm determination, to do their full share in supporting the civil population and the armed forces of Canada and her allies. They quickly adjusted themselves to war-time conditions. The aim of all was larger areas for essential crops and the utmost increase in production. Despite the ever-increasing scarcity of labour and accumulating difficulties of other kinds, the goal has been attained each year. Farmers and their families have taken a special pride in fulfilling quotas. In each parish the farmer is backed by an Increased Production Committee specially set up to deal with food production problems. There were 920 such committees at work in 1943. With their help production quotas have been exceeded almost everywhere.

A herd of Canadian milk cows, St. Nicholas

Raymond Lake and Mountains, Terrebonne

Though weather conditions were unfavourable, the results obtained in 1943 will serve as an example of what our *habitants* have accomplished. Statistics for that year show a net increase in field crops of 150,000 acres or 2.3 per cent. Without disparaging in the least the efforts of farmers in other parts of the country, we note with pride that Quebec is the only province where larger areas were devoted to all field crops in 1943 than in the preceding year.

The total output of dairy products has exceeded the goal set by the Dominion-Provincial Conference. The aggregate figures for butter and cheese were 121,597,577 pounds in 1939 and 150,016,157 pounds in 1942. Final statistics for 1943 are not yet available. The total value of all dairy products was $56,690,143 in 1939 and $77,468,054 in 1942; and it should not be forgotten that these excellent results were obtained without any increase in the number of milk cows and when labour shortage had become acute in many districts.

In every part of the province vegetable gardens were more numerous than usual last year. Augmented by the output of some thirty thousand Victory Gardens in towns and cities, production kept pace with demand and, had weather conditions been favourable, an impressive quantity of food would have been available for export. However, eighty canning factories were in operation last season and a new dehydration plant was kept busy processing vegetables for the armed forces.

Quebec holds undisputed first place in the production of fibre flax. The crop grown in 1943 amounted to 30,000 acres or 75 per cent of the total Canadian acreage. The importance of flax to the successful prosecution of the war is well known. Our production has leapt from 4,000 acres in 1939 to 30,000 acres last year, an increase of 650 per cent. Flax is processed in twenty-two mills, eighteen of them erected since 1939, owned and operated by growers on a co-operative basis.

Sugar rationing has restored maple sugar to its old time popularity and

Quebec supplies 80 per cent of the Canadian crop. More trees were tapped in 1942 and 1943 than even in the days when cane sugar was unknown here. The 1941 crop in Canada amounted to 2,037,400 gallons, of which Quebec's share was 1,650,000 gallons. The figures for 1942 are 2,876,900 gallons and 2,272,400 gallons respectively, or over 23,000,000 pounds for Quebec alone. The gross farm value of the crop set an all-time high record of $5,966,500 for Canada and $4,408,500 for Quebec. It should be remembered that less than one-third of our 150,000 farms have a sugar bush and that, last year, production was reduced to some extent by lack of labour and equipment.

In order to make a more generous contribution toward the national sugar requirements and at the same time indirectly improve the heavy soils of the St. Lawrence Valley, the Government deemed it advisable to introduce sugar beets into Quebec. Following years of successful tests, 10,000 acres will be grown in this new crop next season. A large refinery is now being erected at St. Hilaire, capable of processing 100,000,000 tons of beet roots which will yield about 25,000,000 pounds of sugar.

This has been but a very brief and necessarily incomplete review of the Quebec farmer's war effort. The success already achieved in spite of many difficulties will undoubtedly be repeated from year to year as long as the war lasts. From one end of Canada to the other the soldiers of the soil have gallantly held the farm front. They will continue to hold it. Our farmers have spared themselves no sacrifice in the struggle to extract from the soil the maximum yield of essential foods. Aided by women and children, toiling from sunrise to sunset, they have performed an almost impossible task. We may rely upon these steady, patriotic workers with complete confidence that they will continue to make their full contribution to the common cause until final victory is won.

Post-War Outlook

What the state of Canadian agriculture will be after the war, none but a prophet could foretell, and the species is apparently extinct; but we may very well state our objective and outline our plans for the immediate future. Our objective is to ensure the stability of agriculture and increase its efficiency, to promote the welfare of the rural community, to place on farms the greatest possible number of ex-service men and former workers in war factories, and by so doing to maintain our political institutions, social peace and economic prosperity.

Everywhere in Canada reconstruction committees are feverishly at work on plans designed to ensure the happiness of the people. Even though they be imperfect, as human plans are bound to be, they are sure

Farm house at Village des Aulnaies

to contain much that is excellent. In Quebec a special committee recently reported on post-war agricultural problems and how they might be solved. Without going into the details of the programme as planned by the committee, we may summarize its recommendations as follows:

1. Soil Conservation and Restoration Policy

In order to restore agriculture to a higher level of efficiency and increase the fertility of land, especially after the strain to which it has been subjected during the war, we intend to undertake a comprehensive programme along the following lines:

(*a*) Large-scale land drainage projects throughout all agricultural districts, as an indispensable prelude to any subsequent improvement;

(*b*) Encouragement of a more generous use of fertilizers; chemical fertilizers should be made available to every farmer at the lowest possible cost;

(*c*) Facilitation of stone-clearance wherever needed to make full use of all cleared land in the Appalachian region and other mountainous districts, the Government supplying adequate machinery and making grants;

(*d*) Application of remedial measures for controlling water and wind erosion;

(*e*) Reclamation of non-arable lands by reforestation.

2. Production Policy

The present farming system will probably require adjustment to enable it to meet competition after the war. With this in view it is proposed:

(*a*) To maintain mixed farming but foster greater diversification of crops;

(*b*) To concentrate certain cash crops in definite zones in order to reduce production costs, obtain commercial volume and facilitate distribution;

(*c*) To promote a more appropriate adaptation of crops to regional peculiarities such as soil, climate, markets;

(*d*) To stimulate a more extensive recourse to mechanization in farming operations, under a system of co-operation between neighbouring growers.

3. Agricultural Industries

(*a*) Aid to new industries in order to render agricultural production more complete;

(*b*) Aid to research workers to promote the discovery of new uses for raw materials derived from the soil.

4. Economics, Sociology and Education

(*a*) Full support to the *Caisses Populaires* and co-operative organizations;

(*b*) Better rural schools (plan in process of execution);

(*c*) Increase in the number of practical schools of agriculture to afford adequate training for every farmer's son;

(*d*) Mechanized land clearance in colonization districts to meet the post-war requirements of soldiers and civilians alike;

(*e*) Health insurance and expansion of health services to cover all rural districts;

(*f*) Aid for rural electrification, erection of community halls, etc.;

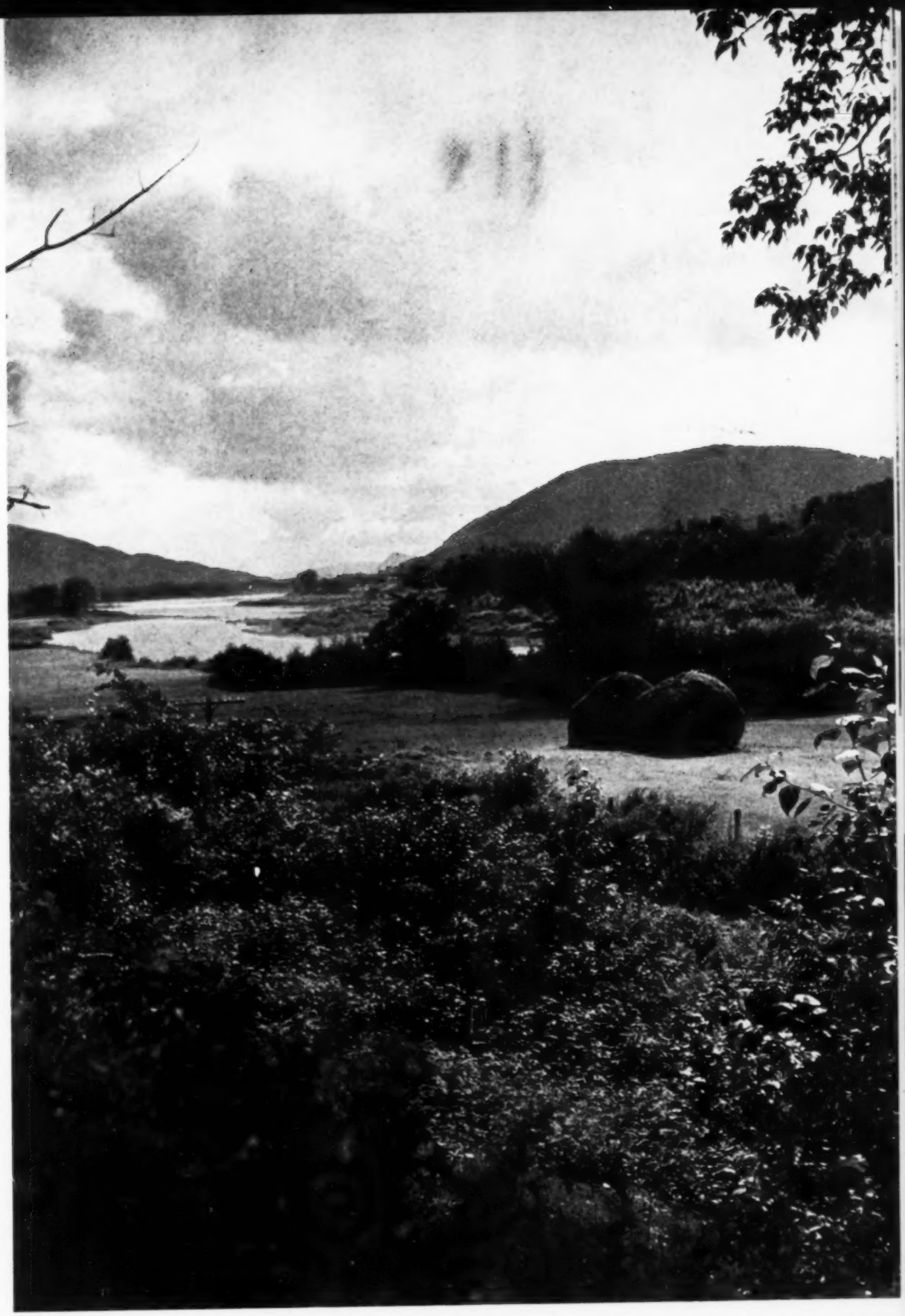
(*g*) Facilitation of repairs and alterations to ensure maximum comfort in rural homes.

Conclusion

Whatever changes may be in store for Canadian agriculture in the years to come, mixed farming will be the rule in Quebec for a very long time. This balanced system, to which seven-eighths of our rural people adhere, may not produce riches overnight, but it has proved the safest in the long run and will outdo and outlast all others.

Despite changes in methods of production, the Quebec farm must remain a family undertaking, a *bien de famille*. It must not become a "factory" exactly like a thousand others, a mere machine devoid of individuality, a mere money-making device in a materialistic world. It must be a living part of a living community, a harmonious combination of spiritual, social, moral and economic values.

Such is the role of the sturdy, valiant, peaceful, unassuming man living with his large family on a narrow strip of land somewhere in Quebec. He leads a simple life, remains true to his God, his blood and his traditions. He devotedly serves his country in peace and in war, regularly caters to millions of consumers, constantly toils to further national prosperity, and is a bulwark of resistance to social sabotage. With admiration and gratitude let us salute our worthy French-Canadian brother, the Quebec *habitant*.



Quebec's Matapedia Valley — serene, unique

Photo by J. W. Michaud

Tangles of trees and shrubs provide food and shelter for migrant and resident birds.

Photos by F. A. Urquhart

Entrance to Point Pelee National Park

Point Pelee—A Canadian Port for Birds

by **L. L. Snyder**

Forest trees clothe the peninsula near its apex which points south across Lake Erie.

Photo by E. Flickinger

POINT Pelee lies on latitude 42°N. If you were to look at your map of North America and follow this parallel through, you would find that it crosses Cape Cod on the east and marks the northern boundary of California on the west. We think of these extremes as well down within the land mass of the United States, and so they are, yet Point Pelee is a part of the Canadian mainland. It is an arrow-head of sand pointing southward from the north shore of Lake Erie near its western end, a peninsula of low relief, buttressed to the north shore by the sweeping curves of its beaches. It is about six miles across its base and nine miles from base to tip. There are no harbours, important piers, or deep shore-waters, yet

A characteristic view of Point Pelee's shore-line

Orchard Oriole

Point Pelee is a renowned port—for migrating birds.

Actually most of the Point is marshland (extensive portions, near the base, now reclaimed for market gardening). Dry terrain is limited to strips running down the east and west borders, converging and embracing the tip. Forest trees occupy dry land back from the beach on the western margin and across the peninsula close to its apex, but most of the east border is unforested. In accord with the southerly geographic location of Point Pelee, and because Lake Erie has a moderating effect on its climate, a southern flora and fauna is established there — a biota having a likeness to, say, that of Kentucky. These features make Point Pelee of more than casual interest to Canadians; it is Canada's deep south.

There was, then, perfectly sound reason for reserving much of the Point from ordinary use and making it a National Park. Administration of the area by the National Parks Bureau assures the preservation of a unique bit of Canada. A limited development of recreational facilities for public enjoyment and comfort forms part of the park plan; but, very wisely, definite portions have been set aside for Nature herself.

Recognition that Point Pelee was a veritable outdoor laboratory for natural history research came early. It seems to have been first discovered, as such, by Dr. William Brodie, a Toronto naturalist who later held the post of Provincial Biologist. He visited the Point in 1879. It was "re-discovered" by Dr. William E. Saunders of London, Ontario, who, for many years since 1882, made observations there. In fact, Saunders introduced a long list of illustrious naturalists to this area and was a member of the one-time Great Lakes Ornithological Club, which organization was instrumental in building up a considerable background of biological knowledge of Point Pelee. The peninsula has lost none of its importance as a place for observation of nature, particularly as a vantage point for the study of bird migration. It is an important port for birds, both for transients on their regular annual excursions, and for summer residents. The latter include occasional immigrants, birds that arrive as avian pioneers in response to various natural pressures. Some have effectively extended the living space of their kind.

The vast majority of Canadian birds migrate. At the close of the reproductive season, from mid-summer until snow flies,

Line drawings by T. M. Shortt

Sharp-shinned Hawk and Olive-backed Thrush

Mourning Dove

Yellow-breasted Chat

there is a slow but steady exodus. With feather-dress and physical vigour refreshed, birds which have nested in Canada move elsewhere and escape the rigours of our climate. In the places where they spend the winter the climate will be more moderate than that which prevails on their nesting grounds. Incidentally, none of our migrants nests while visiting its winter home.

I do not wish to place too much emphasis on the idea of escape and thus imply that climatic adversity was the *causa causans* of bird migration. The origin of this habit, rooted as it is in the ancient past, is a highly theoretical topic. We must remember that migration involves seeking out the breeding ground in spring as well as departing from it in autumn. The phenomenon of migration concerns a round-trip, not a one-way traffic.

At this time of the year countless birds are returning to Canada, the land of their nativity. They come from the middle and southern United States, from Mexico and the Islands of the Caribbean, from Central and South America. Some that will pass north to the high Arctic started from Patagonia, the southernmost continental point of the New World.

Many weeks ago our migratory birds in far places began to respond to some internal, probably chemical, change. Gradually they became restless. The flock-call was heard more often, and short experimental flights, mere "take-offs" and "landings", became frequent. Then came a day, or night, when they abandoned their feeding ground and were off on the long flight. Stop-overs for feeding were made, but they kept approximate pace with the advancing spring season. As their goal was approached, the migration became more hurried and certainly more evident and conspicuous to casual observers. The birds this spring are following an age-old pattern of behaviour. Countless generations of their kind have behaved in the same way, followed the same route, and arrived at a given place at about the same time.

By what means do birds return along the trackless aerial highways to their breeding grounds? Certainly not by the functioning of some unique organ which they possess. The dissected bird reveals no special seat for this faculty and our knowledge of migration will probably not be greatly enlarged by anatomical study. Although our approach to a further understanding of the migration phenomenon will include work in the laboratory as well as in the field, a great deal of direct observation out-of-doors is essential.

The migration of birds has intrigued man since very early times. Much of the mystery surrounding the disappearance of birds in the autumn and their reappearance in spring has been removed by the observations of countless persons, in innumerable places, throughout the years. We now know that certain places are more fruitful for direct observation than others. The island of Heligoland in the North Sea is a classical site in Europe. In America a few places such as Cape May, New Jersey, are recognized as situations where pronounced migratory movements can be witnessed. It may not be well-known to Canadians that one of the best stations in eastern North America is Point Pelee, Essex County, Ontario.

Point Pelee is, in effect, the apex of a large geographic funnel. The land area

of southern Ontario tapers southward, or southwestward, toward the great Mississippi flyway, as it becomes more constricted by the convergence of the lower Great Lakes. Through this funnel passes a considerable percentage of the bird population which occupies our vast North in summer. In spring, birds which reach the south shore of Lake Erie, more particularly those which fly by day, aim at this port-of-entry, and, in autumn, as if clinging to land as long as possible, they pour down the peninsula and off its apex.

Observation over wide continental areas has shown that marked physiographic features — coast-lines, river courses, peninsulas — tend to be routes for concentrated flights of migratory birds. It cannot be assumed, however, that such physical features are essential, indispensable, visual guides to birds. Some fly over trackless seas and plains, and many kinds migrate on a broad front as demonstrated by the fact that few places are without their quota in season. It is perhaps true that birds concentrate along certain routes because the terrain affords suitable places to stop and feed, or because prevailing air currents are positive aids in flight. We cannot dismiss, however, the possibility that land formations, coasts, valleys, and peninsulas, do serve as visual guides to day-flying birds and also, perhaps to a lesser extent, to those that fly at night. Observations made on Point Pelee bear on this question.

Taverner and Swales writing on *The Birds of Point Pelee* state, "The Humming-bird . . . . . comes sailing down the Point over the tops of the last shrubbery and then dropping down to within a few feet of the sand *follows its curves and windings* out to its most extreme tip when, squaring away at an angle to its flight of a moment ago, it makes straight for Pelee Island." Pelee Island, which lies about nine miles off shore, is visible, at least to man, from the end of the Point.

The actual arrival of birds on Point Pelee in spring has not been witnessed frequently. This is in part because the majority of birds fly by night and come to earth at a time when observations are difficult to make. The experienced observer who familiarizes himself with the birds present on the Point during a period of spring may find little change in the kinds or numbers from day to day. He may scan the southern sky off the Point regularly without detecting an in-coming bird. Then it happens on a morning following a mild mellow night that the woods, thickets, and marsh-borders are alive with new arrivals.

In spite of the relatively advanced stage of our knowledge of the mechanics of bird migration, as compared with early times, there is still sufficient mystery to make its study entrancing. Observations on Point Pelee have revealed a baffling and, at the same time, intriguing question in regard to direction of flight. Fancy standing near the end of the Point on a bright spring morning, with a gentle south breeze off Lake Erie blowing in your face. You feel that spring is fairly rushing northward and realize that new life is stirring in all the vast land of Ontario at your back. You know the birds are returning from their winter homes. You know their kinds and where they have wintered and when they are due back. Yet, from behind you, from the north, in spring remember, there is an intermittent flight of these very birds leaving Point Pelee and travelling without hesitation south over Lake Erie and out of sight! The kinds you may see in such a flight on a given day depend to some extent on the date of observation, but, in mid-spring, Red-wings, Bobolinks, Grackles, Meadowlarks, Cowbirds, Red-headed Woodpeckers, Goldfinches, Swallows of several kinds, Mourning Doves, Chimney Swifts, Flickers, Kingbirds, and many others have been observed. Most of those mentioned habitually migrate by day but night fliers too have been observed — Yellow Warblers Myrtle Warblers, Scarlet Tanagers, Indigo Buntings, etc. Also it can be added that three species of non-native but now resident birds in North America have been observed southbound off Point Pelee in spring, namely, the so-called English Sparrow, the Common Starling, and the Common Pigeon.

To date any explanation of this reversal of spring movement of birds is conjectural. The gentle south wind, mentioned above, seems to be regularly correlated with such flights. Yet one may suspect that, if bird migration were so inextricably dependent on the vagaries of the wind, bird arrival in spring would not be the regular schedule we know it to be. Here is a subject for careful and long-time study.

Autumn is the season when pronounced movement of birds on Point Pelee can be witnessed. The Sharp-shinned Hawk, one

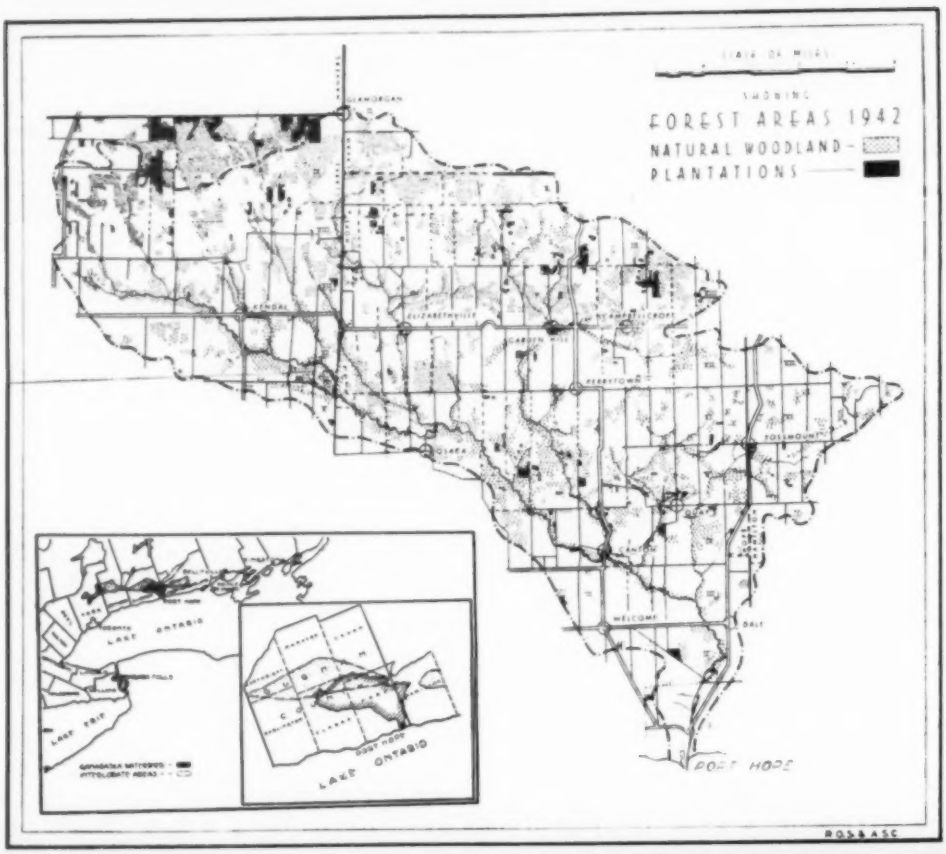
A view of the marsh which embraces much of Point Pelee.

Photo by F. A. Urquhart

of the smaller representatives of our carnivorous birds, is not met with in numbers any place in Ontario in summer, scattered as it is over our vast wild land to the north. The species starts its southward migration in late August, and, by mid-September, Sharp-shins are concentrated along the western end of Lake Erie's north shore. Thousands pass down the Point during a period of three or four days in September, and, since they are day-fliers, they can be seen streaming across Lake Erie toward the Ohio shore. Similar concentrations of night-flying species may be observed on the Point, the Olive-backed Thrush, for example. There are days as mid-September approaches when these birds fairly swarm over the Point, feeding in the shrubbery, restoring their vitality for another flight. They disappear at night presumably across Lake Erie on another lap of their journey to Central and South America.

Thus Point Pelee serves as a highway and refreshment station for migrant birds. In addition, it is known to be an important bridge-head for species which are pushing back their range frontiers northward. It is the only Ontario station where the Orchard Oriole is established in conspicuous numbers. This dainty southerner has found the environment of the Point eminently suited to its needs, and it enlivens the scene with one of the finest and musically satisfying songs of the bird world. Then, too, there is the Yellow-breasted Chat, a shy but robust member of the warbler family. Though not plentiful, it at least has a definite hold on Canadian soil at Point Pelee. One could mention the Carolina Wren, the Mockingbird, and especially the Cardinal as representing species which have made use of the Point as a port-of-entry. In the case of the Cardinal there is every reason to believe that its foothold on Point Pelee led to its ultimate establishment over a wider range to the north, and no one will deny that this bird is a very welcome addition to our bird life.

This account is but a brief introduction to Point Pelee as a place of unusual importance to birds and a strategic location for bird study. Its reservation as a National Park assures that it will remain unspoiled as a highway, stop-over and port for migrants. We can look forward to the day when the area will receive the constant and close attention it deserves as an outdoor laboratory.



At top : — Throughout the agricultural part of the area the river and its tributaries in most cases are well protected with trees. Restocking with fish would provide good fishing.

Some woodlots contain mixtures of hardwoods and conifers of good size.

THE GANARASKA WATERSHED SURVEY

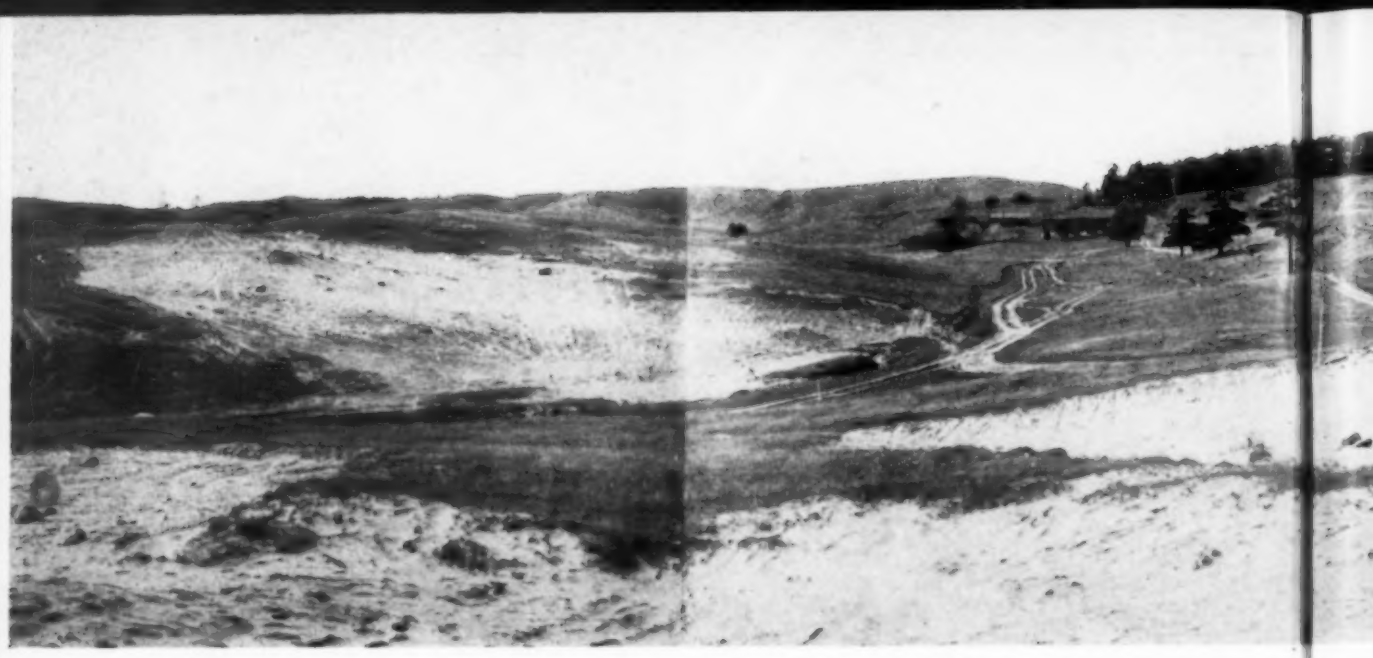
by **A. H. RICHARDSON**

TWENTY years ago it was estimated there were 8,500 square miles of land in southern Ontario which was marginal or submarginal with respect to agriculture. Recent investigations show that in spite of the expanded conservation programme of the Government, such areas are becoming larger, water in streams and wells is becoming less, and erosion of different types (including topsoil washing on agricultural land) is increasing. At the present rate at which remedial measures are being applied, it is estimated that it will take 800 years to deal with the problem.*

The Ganaraska Survey was undertaken to determine the amount of post-war employment which could be provided by conservation projects in southern Ontario. It was not intended to be a routine or maintenance survey *per se*, but rather a piece of research in the field of conservation; accordingly, it presented an opportunity to indicate and improve the technique of conservation surveys which are necessary in many other parts of southern Ontario. It also serves as a yardstick for estimating the total amount of this type of work which could be done.

The initiating of the survey goes back to the formation of the Guelph Conference. In the spring of 1941, several groups interested in the conservation of our renewable natural resources sent delegates to a meeting at the Agricultural College,

* *Conservation and Post-war Rehabilitation*—a report prepared by the Guelph Conference, 1942, page 9



A panorama of abandoned farm land on the town line between

Guelph, for the purpose of discussing this problem, and if possible obtaining the assistance of the governments in such work, as it represented a useful post-war employment project. The Guelph Conference included municipal officers, naturalists, hunters and fishermen, war veterans, foresters, agriculturists, biologists, and teachers, and was a representative cross-section of the business and professional men of the province. Subsequent to this meeting, representation was made to the Dominion Advisory Committee on Reconstruction, and the Prime Minister of the Province of Ontario, with the result that the Dominion and Ontario Governments agreed to collaborate in a sample or type conservation survey.

The Ganaraska Watershed is an area of approximately 103 square miles in Durham and Northumberland Counties, Ontario, lying north and west of the town of Port Hope. It is drained by the river of the same name, which empties into Lake Ontario at the above town.

The watershed is not large in comparison with some others in southern Ontario, as, by way of comparison, the Grand River has a drainage area of 2,600 square miles, the Thames a drainage area of 2,220 square miles, the Humber a drainage area of 220 square miles, and the Moira a drainage area of 1,090 square miles. The river is unique, however, in that its headwaters all rise at the base of an interlobate moraine, which consists of land for the most part of low agricultural value. For this reason, the headwaters can be more easily controlled by reforestation and other methods, and the whole area is a good example of the relationship between forest denudation and intensity of run-off.

The river system is made up of an extensive ramification of tributaries, consisting of two main branches and innumerable smaller ones. Ten of the main tributaries have been named, while the smaller branches are known locally by the names of old mills which once operated on them, or by the names of the owners of the property through which they run. The main river is 21¾ miles long and drops approximately 750 feet from its source to Lake Ontario. Much of this drop, however, is in the first few miles — in some instances as much as 390 feet in the first four miles. Such steep gradients at the headwaters of these streams have a direct bearing on

A panorama of the watershed, looking southeast from Lower H

wn line between Clarke and Hope Townships, looking north.

the rate of run-off, especially during periods of heavy precipitation. That the headwaters streams extended farther north in earlier times, when the moraine was heavily timbered, is indicated by old maps of the counties; namely, *Tremaine's Map* of 1861, and the *Historical Atlas of the Counties* published in 1878. Many of the dried-up water courses can still be followed, and these help to increase the rate of run-off on this part of the watershed at certain seasons of the year.

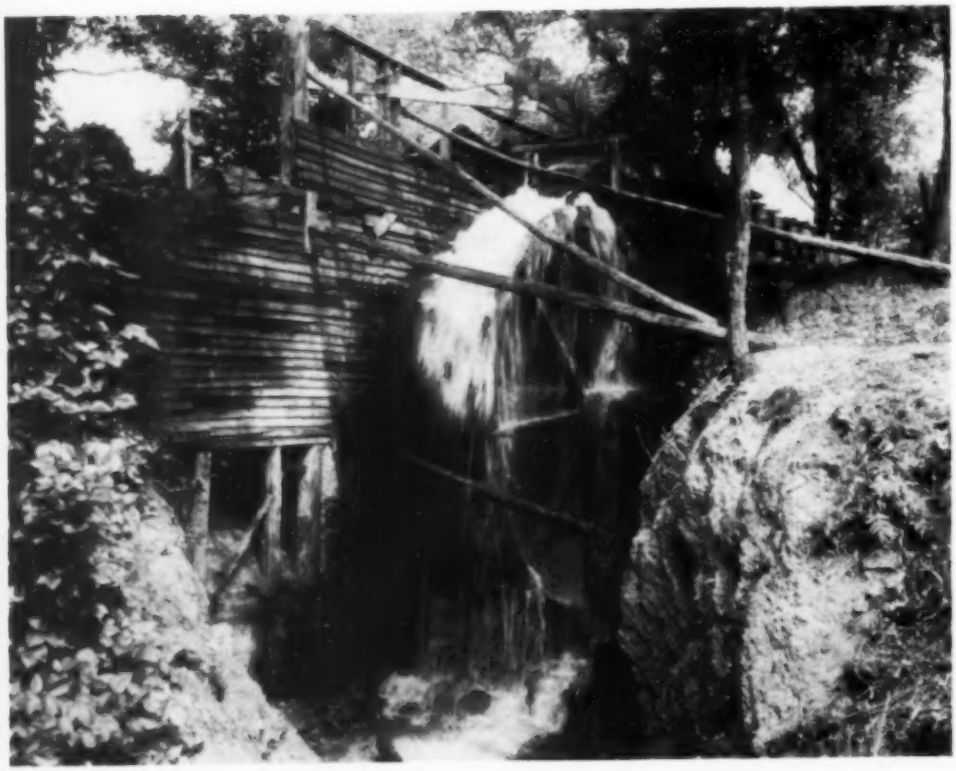
Settlement commenced as early as 1793 (the same year as the founding of Toronto by Governor Simcoe); therefore, the area may be considered one of the oldest settled parts of the province. In early times, before the coming of the white man, different Indian tribes had congregated at the mouth of the river, attracted by the wild life—particularly beaver and fresh-water salmon which were so plentiful there. One of these villages was called Ganaraské; from this the river takes its present name. Later, a fur-trading post was established by Peter Smyth at this point, and, for many years after, the river and the settlement were known as Smith's Creek. In 1793, Jonathan Walton and Elias Smith undertook to bring settlers into the area, in accordance with the expanding settlement programme being initiated by Governor Simcoe. "Four families, consisting of twenty-seven souls" comprised the original pioneers. Settlement fanned out from the lake, and it was not long before several rural communities sprang into being, in what is now the good agricultural part of the watershed.

From 1837 to 1881, settlement expanded rapidly. During this period the population of the rural communities, as well as Port Hope, reached a high mark which has not since been equalled. After 1881, due to the near exhaustion of timber and the fact that much of the land in the north was of poor agricultural quality, young people began to migrate from the area, with the result that the population (1861-1941) decreased one-half for the townships of Clarke and Hope, and several communities disappeared altogether, while those remaining are only skeletons of their former selves.

Throughout the history of the watershed, the forest has formed a "back drop" for the whole area in its commercial and community life. Commencing with the export of masts for the Royal Navy, and

st from Tower Hill. Elevation 1,285 feet above sea-level

In early days many ponds and dams were established on the area. Some of these could be rebui[lt] and, wit[h]



Water power was used extensively for mills of different types, as many as forty-five operating at one time on the watershed.

U. S. Forest Service photo

rebuilt and, with the present ones, form pondage areas for water storage and wild-life centres.

squared timber for the British market, the products ran the gamut of all those with which we are familiar to-day, and more. Lumber, chiefly pine, stood at the top of the list, reaching its maximum export in 1879, when fifty million feet were shipped from the harbour at Port Hope. Hand-made shingle-makers — and later shingle-mills — produced roofing for the homes in the area and for export. Cooperage for whisky kegs and fish packages was carried on extensively; fuel in great quantities was cut for the wood-burning engines on the railway, and large quantities of other material were used for building plank roads, fencing and railway ties. Timber was also responsible for many small industries in the villages around which the community life centred — the manufacture of tools, utensils, furniture, vehicles, and building material of all kinds.

For all these industries, the river supplied the necessary power. As early as 1795 the first mill was built by Smith and Walton near the mouth of the river, and as settlement advanced the area became dotted with dams and mill-ponds, until, by 1861, thirty-six mills were in operation. Most of these were built as saw-mills, a few were grist-mills which supplied the settlers with flour and chop, a few were woollen-mills, and often two or more were combined. As the timber reached the state of near exhaustion, and the population commenced to decline, many of the mills were abandoned, or, in some cases, were burned and not rebuilt, so that to-day mills on the river are few and far between — only eight being in operation for different purposes.

Early in the life of the settlement it was made evident that a river of the character of the Ganaraska could cause destruction, as well as assist in community life. From almost earliest times, and particularly since 1850, floods have occurred on the river. The earliest record of a flood is 1813, when the old log bridge on the main street of the straggling village of Smith's Creek (Port Hope) was washed away. This is evidence that floods may occur even when a watershed is completely covered with forest. Since 1850 floods have become more violent, and, in recent years, namely 1929 and 1937, damage has been done to the town of Port Hope alone amounting to a quarter of a million dollars.

Wild life of many kinds was plentiful when settlement first began. Fresh-water salmon and sturgeon were abundant, as were speckled trout also on the smaller branches of the river. Grouse, hares, muskrats, racoons, wolves, deer and bears were found in abundance before the white man came, and for some years after. Passenger pigeons darkened the sky on

The main street of the Town of Port Hope. The old building being carried downstream indicates the location of Walton Street Bridge. Such floods periodically paralyze the business section of the town.

Where the Ganaraska River passes through Port Hope, the bedrock is exposed, confining the river to a narrow channel. Short bridges and other obstructions aggravate flood conditions. The Walton Street Bridge

their migrating flights, and roosts were located on the sandy ridges. To-day, this abundance is no more — most of the wild life has disappeared; even speckled trout, grouse, and hares are greatly depleted.

Before planning remedial measures on an area of this kind, certain investigative studies have to be made. When this survey was projected, therefore, it was decided to investigate every possible angle of the conservation problem. Basic to any question of land-use is the study and classification of soils. This was done on the Ganaraska jointly by the Soils Division of the Ontario Agricultural College, Guelph, and the Experimental Farms, Ottawa. Besides listing the different types of soils, this survey grouped all soils into four classes, on the basis of their suitability for general farm crops such as are usually grown on any mixed farm in the region. The most important finding of this survey, from a remedial standpoint, was that at the north of the area there were 20,000 acres of marginal and submarginal land, much of which should be withdrawn from agriculture.

Furthermore, it was evident that, on the northern half of the watershed, soil erosion on farm land, particularly where this was adjacent to the tributaries of the river, was becoming increasingly serious. A study of soil erosion on a representative area of 22,080 acres was carried out by the above two groups. This survey shows that if erosion is allowed to go unchecked in this area, further reductions in crop yields and universal land abandonment may be expected. Erosion can be controlled, and greater returns can be obtained from the land, if soil-saving and soil-improving measures such as contour plowing and allied practices are carried out.

Also, to indicate living conditions on these 20,000 acres of the watershed, the Economics Division of the Dominion Department of Agriculture conducted a farm economic survey, covering the fifty-five farmers and their families located on the area. From this it was found that the average level of living of thirty-three of these farmers was lower than for the rest of the watershed, and for a good many farms the level was so low that insufficient necessities were obtained, and almost nothing enjoyed in the way of extras and recreation, which are considered as part of the Canadian level of living.

In addition to the above studies, and others covering the flora of the area, the distribution of insect population and pathological conditions of the forest, an intensive land-use survey was carried out in which each acre of every lot in the area was covered, and reports made on such items as crop land, permanent pasture, plantable land, woodland, forest plantations, streams, springs, ponds, wet spots, flooded land, kettle areas, wells, dams, soils, slope, remains of buildings, fences, quality and size of trees in open fields and on old fence lines, road conditions, vegetation and wild life.

The most important remedial measure recommended on the Ganaraska is the establishing of a 20,000-acre forest on the marginal and submarginal land indicated by the surveys at the extreme north of the area. This would serve as a protection forest. The idle land would be planted with suitable trees, the existing woodland would be improved and planted,

and areas which might still be used for agriculture would remain as such, but become an integral part of the forest property. The badly eroded gullies would be repaired with check dams, and the steep hillside would be reclothed with trees and shrubs.

The main river and tributaries, throughout the whole watershed, are fairly well protected with woodland. As an added protection these should be insured against clean-cutting and should be improved and planted where necessary. On the other hand, there are small stretches of the river that have no protective forest fringe, and which should be replanted where the sites are suitable. When such areas consist of farm land from which there is excessive run-off and top washing, these should be examined by an agricultural engineer, and, where the slope is sufficient to warrant it, be brought under improved agricultural methods such as contour plowing and strip cropping. Where the terrain becomes steep and unsuitable for mixed farm crops, permanent pastures should be established, and, lastly, the hills should be put back into forest.

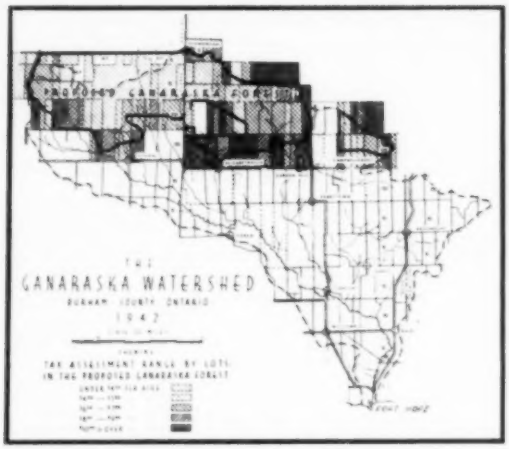
Also, throughout the whole watershed, exclusive of the proposed forest and river protection region, there are areas of poor land on private farms. Owners should be further encouraged to reforest these, under existing government aid, and where areas are too large for individual management, the municipalities should take the responsibility of planting and carrying out remedial measures.

The preservation and care of privately-owned woodlots throughout the area is the concern of the individual owner. On the Ganaraska many of these are run down due to grazing — the survey showing that 75 per cent of the woodlots are subject to this — and haphazard cutting. In some areas clean-cutting is the usual practice, and the custom of selling acre lots for fuel, by auction, is carried on. The result is that such cutting of natural woodland, as time goes on, may easily defeat the purpose of many public-spirited owners who are carrying on a systematic, though small, programme of reforestation. It is urged that all land owners be educated in the management of their woodlots, so that they may envisage the larger purpose of conservation, and that a system of controlled cutting of woodlots be inaugurated. In this way the water-holding and soil-binding qualities of these areas, especially

Headwaters of one of the main branches of the Ganaraska River

Bottom right:—Gully erosion is severe over large parts of the morainic slope.

Below:—On the upper watershed, woodlots have been cut into severely. Where such areas have a direct bearing on conservation, clean-cutting of woodlots should be stopped.



where they are of strategic value from the standpoint of conservation, would be retained. This would not mean that trees could not be cut, but rather that cutting would be done under supervision, so that the fundamental value of the forest would not be impaired.

Another important remedial measure — which is proposed partly for the reduction of floods in the town of Port Hope, partly for the increasing of summer flow in the river, and also for the purpose of putting more moisture into the soil — is the establishing of storage basins, and agricultural and wild-life ponds. Many small ponds could be made by rebuilding some of the old dams on the watershed. These, however, should be considered as agricultural or wild-life ponds only, and would have no important bearing on flooding. Three storage areas have been located; to control flooding it might be necessary to build three dams, which would impound 17,500 acre-feet of water. It is felt, however, that, following a hydrological survey of the river, which was not possible at the time the main survey was conducted, one, or possibly two, of these storage basins would be all that is required.

Top:—Contour plowing and strip cropping are advocated on the slopes of the river and tributary streams to prevent sheet erosion and excessive silting.
U.S. Soil Conservation Service photo

Centre:—A few small areas of second growth white pine can still be found, indicative of the type of trees which were so plentiful on the watershed years ago.

Bottom:—The lower part of the watershed has much excellent land. Farming is of the mixed type, with emphasis on dairy cattle, apples, potatoes and tobacco.

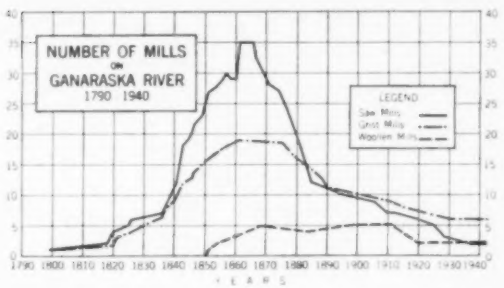
The upper part of the watershed lends itself well to recreational purposes because of its topography, river system, and wooded areas. Several such centres could be established, particularly on the high parts of the moraine, in some of the well-preserved woodlots, and particularly around storage basins recommended for flood-control and wild-life purposes.

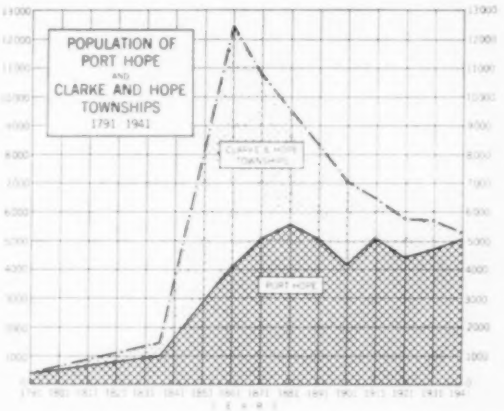
As the whole area originally was predominantly white pine, it would be feasible to replant certain parts of it with this species. Before this could be done, however, some assurance would have to be given that the area be made reasonably free from the white pine blister rust, and this would mean the eradication of the alternate host of the disease; namely, the botanical family ribes (gooseberries and currants), present over much of the area.

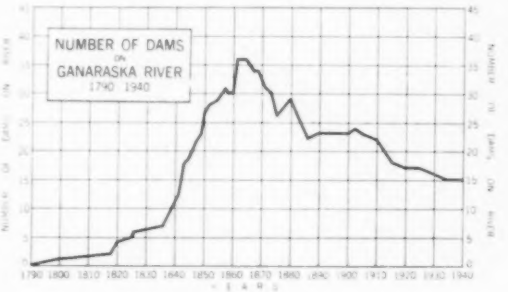
The other remedial measures would include restocking streams with fish; forest-insect surveys; gathering maple syrup; planting of permanent snow fences on highways; roadside planting; the collecting of tree seed; nursery practice; and miscellaneous works such as building bridges, culverts, telephone lines, fire towers, camp fire-places and trails, restoring springs, removing old buildings, protecting stream banks, harvesting ice, and erecting historical monuments.

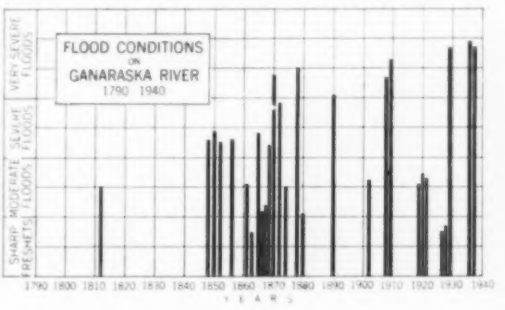
As indicated in the first part of this article, one of the chief reasons for this study was to estimate the amount of employment which could be provided by the rehabilitation of an area of this kind. The survey shows that on the Ganaraska Watershed work can be provided amounting to 2,136,511 man-hours, or sufficient for 600 men during 18 months; or, leaving out the three winter months when such work is impracticable, sufficient work for two years.

In considering this figure, however, it should be remembered that the Ganaraska represents only a small area of southern Ontario which requires such treatment. If this amount is multiplied, say twenty times, it would not include all the needy areas of the province, let alone those which are included in the other provinces of the Dominion where similar work could profitably be undertaken as a project which, on a long-term basis, would prove more than self-liquidating.









View taken from uplands on the Experimental Farm, Nappan, Nova Scotia, showing dyked river flats in background.

MARITIME DYKELAND REHABILITATION

by **E. S. ARCHIBALD**

THE term dykeland is used in its broadest sense. Such land constitutes areas on the seacoast, especially in the upper reaches of the Bay of Fundy, where for centuries tides consistently have been making silt deposits. The construction of dykes to keep out the tide from these areas so that they may be utilized for the production of cultivated grasses, grains, and pasture, and for other purposes, dates back two hundred years or more. Areas thus protected are commonly known in Nova Scotia as dykelands. Longfellow in his *Evangeline*, describing the dykelands of Grande Pre, says "Vast meadows stretch to the eastward, giving the Village its name, and pastures to flocks without number; dykes that the hand of the farmer had raised with labour incessant shut out the turbulent tides, but at stated seasons flood gates open and welcome the sea to wander at will over the meadows."

It is obvious then that these dykelands had been well established long before the year 1757.

The richness of these dykelands was appreciated by the English settlers who replaced the Acadians. The most interesting book dealing with wartime life one hundred years ago is Thomas Chandler Haliburton's *Sam Slick the Clock-Maker*. Sam Slick, the versatile and much-travelled Yankee, said "But what a country this Bay country is. Look at that meader. Bean't it lovely? The prairies of Illinois are the top of the ladder with us but these dykes take the shine off them by a long chalk."

As to the psychology of those farmers in the Amherst and Sackville areas a hundred years ago, Sam is quoted as saying "I guess if they talked more of rotations and less of elections, more of them 'ere dykes and less of banks, and attended more to top dressing and less to redressing it'd be better for 'em."

English settlers followed the Acadians very rapidly in adopting their methods of farming. In the Annapolis Valley orchards and rich fields of the uplands joined the rich dykelands and made a prosperous and beautiful countryside, while timbering in the hills and mountains constituted a further source of rural wealth.

Although fruit-growing did not predominate in the upper dykeland of Truro, Amherst, Sackville and Moncton, yet the fertile upland soil operated in conjunction with the dykelands provided a source of dairy products, beef, sheep and pork, which in those days went a long way toward satisfying maritime markets and a healthy export of very fine beef cattle to be used as feeder cattle in the British Isles. Over forty years ago the cattle embargo against Canadian live cattle for feeder purposes put a stop to this industry. Nevertheless, hay was a marketable commodity and so there was a gradual transition from a live-stock programme to that of hay selling. No farm country ever became wealthy selling hay, and it was inevitable that with the diminished numbers of live stock, soil fertility in the uplands became maladjusted and diminished, while the many fine dykelands gradually became partially depleted of lime and phosphorus, drains became plugged, the running dykes became neglected — all resulting in the

very sad state of affairs existing in many of these dyked areas at the present time. Many of the dykes are now broken and high tides not only "wander at will over the meadow" but are making such a heavy salt deposit along with the silt that hay is ruined, stands of grasses are killed, and with each succeeding high tide still further damage is done to dykes and to drainage outlets which are called "aboideaux".

Areas

The exact acreage of protected dykeland is not exactly known but it is in the vicinity of 70,000 acres. In addition there are large blocks of land which have never been dyked and which, under a reconstruction policy, might eventually be brought into this type of agriculture. The accompanying map gives a reasonable idea as to the location of the existing improved dykelands, a high percentage of which are controlled by organizations set up under provincial charters and are administered by dyke commissioners.

Needless to say all these dykeland owners are also owners of upland farms. Absentee ownership constitutes a problem in some of the dyke organizations. Depleted and deserted upland farms to which dykeland ownership is also attached present an additional problem in administration. It would appear to me that the problem of rehabilitating dykeland should be associated definitely with the whole problem of agricultural rehabilitation in those areas. In other words, the problems of rehabilitating dykeland should be associated equally with the rehabilitation of upland farms, and the whole bound into a progressive live-stock programme. To many who know farm lands in different parts of Canada this would seem to be a perfectly feasible project. These uplands, in the areas where dykelands exist, are usually of fairly strong soil, which might be termed a clay loam, and are free from boulders. In some districts much of the area on these upland farms is now covered with an undergrowth and some have sizable pulp wood. Moreover, a market for meats and dairy products in the Maritime Provinces exists since, according to our most reliable statistics, fifty per cent of the meat consumed in the towns and cities, and all of the meat which goes into the stores of ships sailing from these provinces is imported. However, the writer will not digress further but will confine his remarks to the problems of dykelands themselves.

Have These Lands Degenerated, If So Why?

No doubt many of the better dykelands in the more prosperous communities are as productive as ever. The splendid work done by Mr. W. W. Baird, Superintendent of the Dominion Experimental Farm at Nappan, Nova Scotia, has shown the possibilities of attaining and economically maintaining yields of hay of superior quality — four tons per acre and over — with proportionate yields of oats and other crops.

Nevertheless, there are very large tracts of dykelands which for many years yielded hay, pasture, and grain, the equal of the Nappan marshes, but which, because of clogged drainage channels and for other reasons, have reverted to coarse, water-loving grasses, such as broad-leaf, yielding

Grain growing on dykelands of the Experimental Farm, Nappan.

only a ton or even less per acre and which, in wet seasons, it is impossible to harvest. In some cases whole tracts of marsh, such as that of East Amherst, have thus reverted, and only in exceptionally dry years is it possible to attempt any harvest.

The chemical constituents of these lands have not altered materially. According to the excellent analyses which have been completed to date by Dr. George R. Smith of the Nova Scotia Agricultural College, these lands are still amongst the richest in Eastern Canada. Furthermore, the analyses and experiments conducted by Mr. Baird do show remarkable and favourable response to comparatively small applications of phosphorus and limestone, and fortunately these are two of the cheapest ingredients which can be applied as soil correctives.

Much of this dykeland has degenerated to a marked degree due to lack of proper drainage, proper protection, and the consequent impossibility of applying proper farming methods. Without doubt, also, the general depressed economic situation, which has been particularly adverse to agriculture, has made it impossible for the dyke owners' associations to combat these degenerating factors.

Rehabilitation

The rehabilitation of returned men and of agriculture, after the war is over, would seem to be closely associated problems. There is a works programme in the rehabilitation of dykelands and adjacent uplands which would again provide rich land available for good farming practices. Land for settlement in Canada is so often thought of as uncleared forest lands of the clay belt in Quebec, the clay belt in Ontario, the grey bush soils of the central prairies, the timbering lands of central British Columbia, such as the Upper Fraser and Nechacco Valleys, and the rich uncleared lands of the Upper Peace River and Hay River. More recently still there is talk of soldiers desiring to settle along the Alaska Highway where some good lands have been discovered. Without doubt, in the future growth of Canada these good areas of land will be utilized. It is to be hoped that only the good lands will be allowed for settlement.

All the areas I have mentioned have their appeal, yet it would seem but logical that these Maritime dykelands, with the potentially rich adjacent uplands which are closer to existing social services, population and markets, and to the seaboard where export markets might again be revived in any commodity produced economically and marketed to advantage, would offer at least equal inducements either in connection with a land settlement programme or any works programmes which might be created toward the permanent improvement of our economic existence.

Studies Underway

Realizing the significance of this problem, the two Provincial Governments and the Dominion Government at Ottawa have been giving this matter considerable study. This year the Dominion Government financed and undertook to make a survey of the situation and collect all available information of an engineering and practical nature, with the idea of making close calculations as to what could be undertaken most economically, first to meet immediate requirements of food production, but more particularly in the post-war years.

For this purpose there has been established a Maritime Marshland Rehabilitation Committee, consisting of engineers, soil specialists, and with representative practical dykeland owners. Already this committee is busily engaged in assembling all information regarding urgent works and making additional surveys on which careful estimates might be based.

Mr. W. W. Baird, Superintendent, Experimental Farm, Nappan, Nova Scotia, is Chairman, and Dr. G. R. Smith, Professor of Soils and Chemistry, Nova Scotia Agricultural College, Truro, Nova Scotia, is Secretary.

There are seven counties in Nova Scotia and New Brunswick with major dykeland problems. Within each are dykeland owner associations. Amongst these dykeland owners are very experienced men in dykeland drainage and dyking. Hence it was considered wise to set up an advisory and consulting committee consisting of one dykeland owner representative from each county, chosen by the dykeland owners themselves. This has been done, and the committee is already engaged in preparing a statement of areas, ownership, obvious major drainage problems, broken dykes which must be repaired before spring high tides, and other necessary information.

Surveys

Over a long period of years many surveys have been made by different Dominion and Provincial Departments of Government. These include topographical, boundary, air photo, soils, engineering (drainage), land use and plane table. These data are being collected and checked. Many drainage channels have been blocked by silt or erosion deposits and certain check surveys must again be made before estimates can be compiled.

The Universities of Nova Scotia and New Brunswick have co-operated by allowing students in engineering to delay entering the college year to enable them to give some two weeks' plane survey service this autumn.

These records and surveys must form the basis of this rehabilitation programme which might be approached in three ways:

1. Urgent immediate repairs to dykes to prevent further destruction to crops and works.

2. Experimental work in mechanizing the work of repairing and constructing dykes, the drainage of main vents (drainage canals), aboideaux construction, and the internal drainage of protected dykelands.

3. A longer time programme with a new approach as to more permanent constructions which would involve less upkeep and less risk.

Urgent Immediate Repairs

Dykeland owners are struggling with this problem. Picture, however, a broken dyke whose owner cannot afford repairs. If this is not an organized dyke and if no repairs are made, neighbours may lose the 1944 crop, the stand of grass, and the ditches may be filled with silt.

In organized dykes bad breaks which occurred in 1943 and are still not repaired may in like manner leave all owners helpless.

The writer, as a boy, helped with harvests on splendid dykelands which, because of lack of immediate repairs to a break, caused the ultimate loss of the entire dyke, and the land which was once so productive now yields little or no salt marsh grass.

Experimental Work

As far as time and funds will permit, certain experiments should be conducted toward the mechanical repairing and rebuilding of the dykes. Modern dirt-moving machinery is little known in these farming areas, and yet, in a reconstruction programme it is entirely unlikely that it would be possible to again do extensive work in drainage, construction of dykes, construction of protection weirs, etc., by old hand-methods. Hence, in the development of this programme, adequate machinery should be available so that we might learn from practical experience the possibilities of using different types of drag lines, shovels, bulldozers, carry-all scrapers,

Haymaking on the dykelands of the Experimental Farm, Nappan—three tons per acre.

elevator graders, and all such machines as are used so economically in the development of irrigation projects in Western Canada. Steps have already been taken to assemble some of these machines, especially for ditching purposes.

The Long-time Programme

Present and future surveys will serve as a guide in developing a long-time programme.

To visualize some of the major problems, picture large areas of rich level dykeland, with a tidal stream or river running through in which the tide rises and falls twice daily leaving its deposit of rich silt or a trail of destruction. On either side of this stream are the dykes (termed running dykes) following the meanderings of the stream for many miles inland. Drainage must come through the dykes, hence the many aboideaux. With the silting up of the river, those areas, miles inland, lose their drainage resulting in bogged land. With the exclusion of the tide from this drainage basin by means of one dam at its mouth with only one aboideau, the necessity for maintaining miles of dykes and many aboideaux would be eliminated, thus effecting a tremendous saving in labour and other costs.

What increased areas of salt marsh also could thus be brought under cultivation?

Dyke protection is often a major problem due to exposure to wave action of storms and changing currents in stream beds, which may be prevented only by diversion weirs.

What this programme of rehabilitation might mean to make a prosperous agriculture is evident. What it may cost remains for engineers to determine. What assistance may be given by governments in this work will no doubt be considered in government reconstruction policies and programmes.

One thing, however, is certain, broken dykes, lost rich farming land, and bogged areas formerly yielding three to four tons of hay, or pasturing "flocks without number", add nothing to the gainful employment or to the wealth of the Maritimes and Canada.

To these two provinces by the sea, that have a total area of upwards of 7,000,000 acres with something over 1,000,000 acres under cultivation, this acreage of dykeland may seem comparatively unimportant. Something over 70,000 acres have been or are protected by dykes. It is probable that with the taking-in of lands not so reclaimed the total area might only slightly exceed 100,000 acres. Yet it must not be forgotten that this is the richest land to be found in Eastern Canada. The writer would, however, like to point out again that these areas of marshland are only a part of the vastly greater areas of potentially rich agricultural upland and are supplementary thereto, or at least should be, in the development of a large-scale live-stock and soil improvement programme. Such a programme would go far toward correcting the unfavourable balance of food supplies required for the population in these provinces, for again it must not be forgotten that such supplies for towns, cities, and villages, to say nothing of ships' stores even in peacetime, in these provinces, have been imported from parts of Central and Western Canada, including approximately 50 per cent of meats, 90 per cent or more of cheese, together with a multitude of canned and other products. This is the challenge to be faced by farmers and governments in a post-war development programme involving not only greater production but a much increased rural population and a sounder, more permanent agricultural prosperity.

Dykeland economy: a combination of dykeland and upland farming for the production of live stock can bring prosperity.

EDITOR'S NOTE-BOOK

This war period will probably be recorded as an era of social and economic planning unparalleled in Canadian history. Throughout the Dominion, scientists, educationalists, industrialists and manufacturers have been, and are, studying the findings of world research and experience in a united attempt to formulate patterns for living and working that will meet the needs of the times and ensure employment, good health and a reasonably satisfying standard of existence being made available to all. There is an urgency, volume and unanimity of effort going into this planning that will surely result in legislation representing a notable milestone in the historian's record of Canada's development.

We would be undeserving of our rich heritage of natural resources did we not take adequate steps as a nation to administer them both profitably and wisely in order to derive therefrom for the people of Canada the greatest sustained benefits obtainable. Have not our fighting forces and war workers every right to expect that their contribution will be perpetuated in and rewarded by a more abundant life in the future?

The Canadian Geographical Society has attempted to present in preceding issues of its Journal some of the schemes currently under discussion, together with the reasons which move those responsible for them to urge their early adoption. It is the conviction of the Society that informed public opinion provides the surest guarantee that adequate plans, painstakingly considered and expertly formulated, will form the sound basis of our future economy. In this issue, pertinent conservation topics are treated by authorities whose statements invite careful study. Let us remember that out of the crucible of World War II will arise a new and better Canada — a Canada in which each man and woman will be called upon to play an altruistic, intelligent and informed part as a citizen, not only of the Dominion, but of the World.

Hon. Joseph-Adélard Godbout, Premier of the Province of Quebec, President of the Executive Council and Minister of Agriculture and Colonization, this month provides an illuminating article, "Agriculture in Quebec: Past—Present—Future". Premier Godbout (born at St. Eloi, Quebec) entered Rimouski College in 1913, and subsequently attended Ste. Anne de la Pocatière Agricultural College, Massachusetts Agricultural College (Amherst), Laval University, the University of Montreal and McGill University, obtaining the degrees B.A., B.S.A., Dr. S.A. and LL.D., and he has also been awarded an Hon. D.C.L. by Bishop's University (Lennoxville, Quebec). In 1918 he was appointed assistant professor of animal husbandry at Ste. Anne de la Pocatière Agricultural College, and from 1922 to 1925 was Agronomist for the County of L'Islet, at the end of which period he returned to the Ste. Anne Agricultural College as professor, remaining there for five years. He was first elected to the Quebec Legislature in 1929, was appointed Minister of Agriculture in 1930, and came into office with a comprehensive programme for the promotion of education on agricultural problems; in such problems he has consistently evidenced the deepest interest, and concerning them he is enabled to gain first-hand knowledge on his own model farm (at Frelighsburg, Quebec), which is fully equipped for cattle and horse breeding, fruit growing and mixed farming. Premier Godbout has been president or secretary of numerous agricultural associations, including the C.S.T.A., of which he was President in 1933.

L. L. Snyder was born at Panora, Iowa, and received his museum training in the Liberal Arts College of the State University of Iowa. He joined the staff of the Royal Ontario Museum of Zoology, Toronto, as Technologist, in 1917, was made Curator of Birds in 1935 and Assistant Director in 1938. In addition to his educational and administrative activities, he has directed a faunal survey of the Province of Ontario and contributed extensively to the literature on zoogeography, taxonomy, ecology, etc., particularly with respect to birds.

Arthur Herbert Richardson, author of "The Ganaraska Watershed Survey", is a native of Toronto, where, for five years before entering university, he was engaged in engineering and surveying work for the City Engineer's Office. In 1915 he received

(*Continued on page IX*)

The Canadian Geographical Society

OTTAWA CANADA

HONORARY PATRON

His Excellency Major-General the Earl of Athlone,
K.G., P.C., G.C.B., G.M.M.G., G.C.V.O., D.S.O.

CHARLES CAMSELL, C.M.G., B.A., LL.D. } Honorary Presidents
J. B. TYRRELL, M.A., LL.D., F.G.S., }

BOARD OF DIRECTORS

GEORGE J. DESBARATS, C.M.G., D. App. Sc., President

CHARLES G. COWAN, Vice-President
LT.-GEN. A. G. L. McNAUGHTON, Vice-President
Hon. W. A. BUCHANAN, Vice-President
R. C. WALLACE, Vice-President
J. A. WILSON, Vice-President
O. M. BIGGAR, K.C., Honorary Counsel
K. G. CHIPMAN, Honorary Treasurer
E. S. MARTINDALE, Honorary Secretary

Hon. A. E. ARSENAULT, Assistant Judge, Supreme Court, Charlottetown, P.E.I.
MARIUS BARBEAU, National Museum of Canada, Ottawa
ARTHUR BEAUCHESNE, Clerk of the House of Commons, Ottawa
LAWRENCE J. BURPEE, Secretary for Canada, International Joint Commission, Ottawa
CHARLES CAMSELL, Deputy Minister, Department of Mines and Resources, Ottawa
AUGUSTIN FRIGON, Montreal, P.Q.
Maj. Gen. W. W. FOSTER, Vancouver, B.C.
K. A. GREENE, Ottawa
GILBERT A. LABINE, Toronto, Ont.
F. C. C. LYNCH, Department of Mines and Resources, Ottawa
B. R. MACKAY, Department of Mines and Resources, Ottawa
LT.-COL. L. T. MARTIN, Ottawa
Dean C. J. MACKENZIE, Acting President of National Research Council, Ottawa
LT.-COL. SIDNEY C. OLAND, Halifax, N.S.
F. H. PETERS, Surveyor General of Canada, Ottawa
H. M. SNYDER, Montreal, P.Q.
E. J. TARR, K.C., Winnipeg, Man.
GRIFFITH TAYLOR, University of Toronto, Toronto, Ont.
J. C. WEBSTER, Shediac, N.B.

Editorial Committee

F. C. C. LYNCH, Ottawa, *Chairman*
F. D. L. SMITH, Toronto
Hon. W. A. BUCHANAN, Lethbridge
H. L. TRUEMAN, Ottawa
Hon. A. E. ARSENAULT, Charlottetown
LT.-COL. G. L. P. GRANT-SUTTIE, Toronto
M. Y. WILLIAMS, Vancouver
D. C. HARVEY, Halifax
J. C. WEBSTER, Shediac
F. J. ALCOCK, Ottawa
ROBERT ENGLAND, Ottawa
JAMES SPENCE, London, England
GORDON M. DALLYN, *Secretary*
W. EGGLESTON, Ottawa
A. B. WATT, Edmonton
OLIVER MASTER, Ottawa
GEORGE W. BROWN, Toronto
ROBT. J. C. STEAD, Ottawa

Executive Secretary and Editor
GORDON M. DALLYN

Auditors
DAVIS, BOYCE & COMPANY

The Society's ambition is to make itself a real force in advancing geographical knowledge, and in disseminating information on the geography, resources and people of Canada. In short, its aim is to make Canada better known to Canadians and to the rest of the world.

As one of its major activities in carrying out its purpose, the Society publishes a monthly magazine, the Canadian Geographical Journal, which is devoted to every phase of geography—historical, physical and economic—first of Canada, then of the British Empire and of the other parts of the world in which Canada has special interest. It is the intention to publish articles in this magazine that will be popular in character, easily read, well illustrated and educational to the young, as well as informative to the adult.

The Canadian Geographical Journal will be sent to each member of the Society in good standing. Membership in the Society is open to any one interested in geographical matters. The annual fee for membership is three dollars in Canada.

The Society has no political or other sectional associations, and is responsible only to its members. All money received is used in producing the Canadian Geographical Journal and in carrying on such other activities for the advancement of geographical knowledge as funds of the Society may permit.

(*Continued from page VII*)

his B.A. degree from McMaster University, and, in 1916, his M.A. in biology. He was awarded a fellowship to Harvard University and obtained there his S.M.Silv. (Forestry) degree in 1920, since which time he has been with the Ontario Department of Lands and Forests. Mr. Richardson was in charge of reforestation work until 1942, when he was appointed Chairman of the Inter-Departmental Committee on Conservation and Rehabilitation. Author of several bulletins and articles on forestry, he was responsible for founding the *Forestry Chronicle*, published by the Canadian Society of Forest Engineers, and remained its editor for ten years. Since 1926, in addition to his other duties, Mr. Richardson has also held the position of special lecturer in forestry, Ontario Agricultural College, Guelph.

E. S. Archibald—see biographical sketch in February, 1944, Journal.

AMONGST THE NEW BOOK

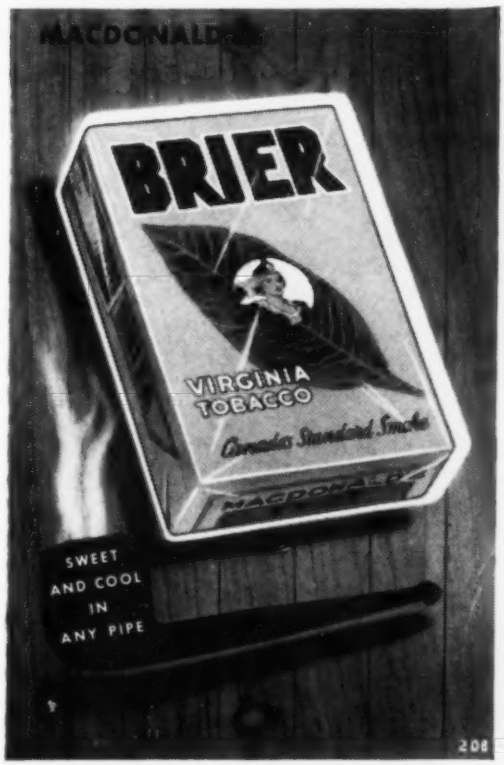
The Incomplete Angler, by JOHN D. ROBINS (Collins, Toronto. . . .Price $3.00).

This book should not be exposed for sale except May 1st and August 31st. It is distinctly a trout season book, and, if read out of season, is all too likely to induce the taking of trout at illegal times or at least to lead one's mind far astray from those legitimate activities associated with making a living. Neither should it be read by any one who is particularly allergic to black flies or mosquitoes or who does not enjoy a soaking in a summer shower. To all others, and that includes all good fishermen, it is the book for which we have long been waiting.

It is merely an account of a fortnight's fishing trip in Ontario's Algonquin Park by a couple of amateur bushmen, who make no pretense of being either expert woodsmen or particularly "hot" with a fly rod. Of course, and in this other fishermen will agree, their outfit was all wrong and how they managed to seduce, with their tackle, even those insignificant specimens of the genus *salmo* that they did catch is beyond all wonder. In fact, it is a marvel that they did not starve to death. By some special grace of art, however, Mr. Robins takes his readers right along in his wanderings from lake to lake to enjoy fleeting glimpses of game, large and small, to suffer the painful traverse of the long portage accompanied throughout by a halo of flies, and to experience with him those emotional reactions to the quick tug on the fly line which are the ultimate in bliss to every angler.

Our author is remarkable in that he gives no weight for any fish caught or even an approximation of their length, except to *insist* that all were of

(*Continued on page X*)



Specializing in the Production of Stock Certificates, Bonds and Cheques for Mining Companies

BRITISH AMERICAN BANK NOTE COMPANY LIMITED

HEAD OFFICE - OTTAWA
262 Wellington Street

511 Place d'Armes **MONTREAL**
1110 Montreal Trust Bldg. **TORONTO**

The Old Canadian Company
Established 1866

HOWARD W. PILLOW
President

CHARLES G. COWAN
Vice-Pres. & Man. Dir.

G. HAROLD BURLAND
Sec. Treas.

Buy War Savings Certificates and War Savings Stamps

This is the Longines Watch of Ruth Rowland Nichols, the earliest to be licensed of women pilots actively flying today. She mixed aviation training with a Wellesley education and makes flying her life work. The Longines Watch was presented to her when she broke the world's altitude record for women in 1931 and since then it has been with her on all her major flights. ¶Ruth Nichols is the only woman ever to have held all three maximum international feminine aviation records for altitude, speed and distance. Now national director of Relief Wings Inc., she was cited by the General Federation of Women's Clubs as one of three women pioneers who contributed most to aviation. ¶Longines is proud that the dean of women fliers, like so many other famous aviators, has always relied on Longines Watches for the serious business of piloting an airplane.

•From documents in our files.

Longines-Wittnauer Watch Co., Montreal, New York, Geneva; also makers of the Wittnauer Watch, a companion product of unusual merit.

Longines

WINNER OF 10 WORLD'S FAIR GRAND PRIZES AND 28 GOLD MEDAL AWARDS

(Continued from page IX)

a legal seven inches. This will stamp him either as a man of unusual probity or else a mean soul who does not even give his readers the opportunity of disbelieving him. Regretfully enough, it seems necessary to challenge his veracity in at least one particular. He claims to have used a long copper line for the first time in his life from a canoe in rather rough water. Those who recall their first introduction to the copper line will feel that our author has been less than frank in not telling of the way the line fouled up on the reel and the kink that developed some 50 feet from the bait where it snapped at the first strike. This would have made another excellent chapter, of which the reader has been robbed, even though the language used at the time, must, of necessity, have been severely edited. His readers could have done with that extra chapter or even two or three of them.

The book is written in an easy, graceful prose which is a pleasure to read. Mr. Robins is not without his own keen humour, which is never laboured, and introduces, here and there, something of the same philosophy that has, since the days of Izaac Walton and the *Compleat Angler*, been associated with the gentle art of angling. This is, incomparably, the best book on the out-of-doors that this reviewer has encountered in many, many a year. It is so good, in fact, that it was read from cover to cover before one became aware, from a note on the back of the slip cover, that Mr. Robins for eleven and one-half months of the year is Professor of English at Victoria College. Let it here be stated that this professorship never intrudes itself into these pages which are wholly a product of the two weeks when he fishes —and writes.

P. E. P.

CANADIAN PRINT & LITHO

SPECIALISTS IN THE PRODUCTION OF CLASS MAGAZINES OF MEDIUM AND HIGH CIRCULATION.

Some of the Publications produced in our plant:

CANADIAN GEOGRAPHICAL JOURNAL
THE LEGIONARY
ROD AND GUN IN CANADA
FOREST AND OUTDOORS
MONTREAL FORUM SPORTS MAGAZINE
MONTREAL MEDICAL BULLETIN

Also many house publications, some government publications, de luxe booklets of institutional character and certain classes of book printing.

We invite enquiries from responsible publishers who seek a printer possessing our unusual qualifications for publication printing. Our plant is complete all under one roof and includes art and editorial services.

CANADIAN PRINTING & LITHOGRAPHING COMPANY LIMITED

2151 ONTARIO ST. EAST - - MONTREAL, QUE.